

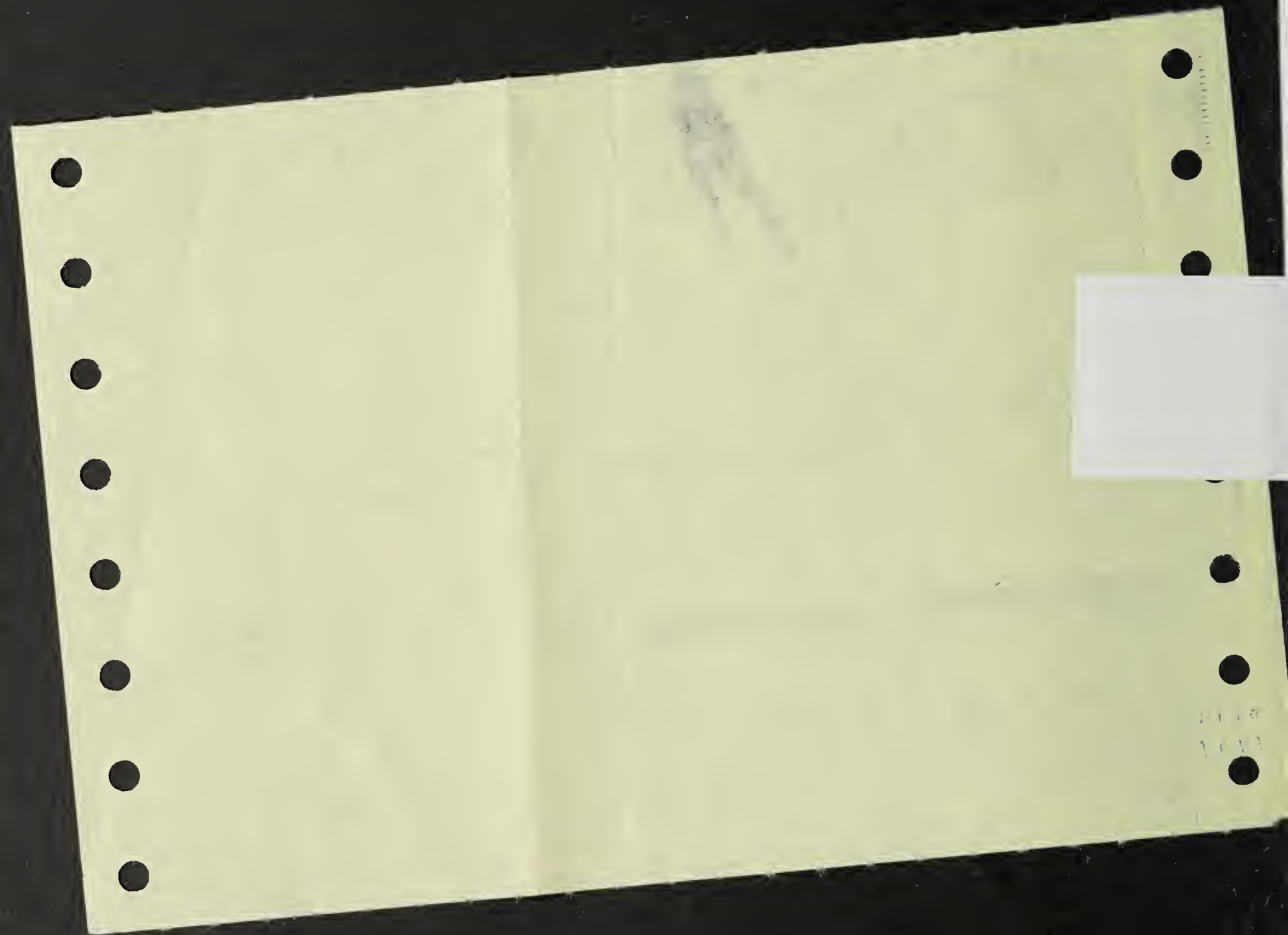
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THE AVICULTURAL MAGAZINE

BEING THE JOURNAL OF
THE AVICULTURAL SOCIETY

Edited by
MARY HARVEY

VOLUME 92
January 1986 to December 1986

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The Avicultural Society

FOR THE STUDY OF BRITISH AND FOREIGN BIRDS
IN FREEDOM AND CAPTIVITY

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1901-1903	R. Phillips		D. A.G. Butler
1903-1904	R. Phillips	1919-1920	Dr. L. Lovell-Keays
	Dr. A.G. Butler		Dr. A.G. Butler
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	Dr. A.G. Butler	1922-1948	Miss E. Maud Knobel
1909-1914	R.I. Pocock	1949-1970	A.A. Prestwich
	Dr. A.G. Butler	1971	H.J. Horswell

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1907-1908	D. Seth-Smith	1926-1934	D. Seth-Smith
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1908-1909	D. Seth-Smith		Miss E.F. Chawner
	Frank Finn		
1909-1910	Frank Finn	1936-1938	Miss E.F. Chawner
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MEDALLISTS OF THE AVICULTURAL SOCIETY

THE PRESIDENT'S MEDAL

Miss Phyllis Barclay-Smith CBE 14th March 1960

Arthur Alfred Prestwich, 14th March 1960

Dr. Jean Delacour, 13th March 1967

Walter Van den bergh, 21st February, 1973

THE KNOBEL AWARD

Sten Bergman, DSC, 14th March 1960

Curt af Enehjelm, 14th March, 1960

THE EVELYN DENNIS MEMORIAL AWARD

Mrs. K.M. Scamell, 13th November, 1967

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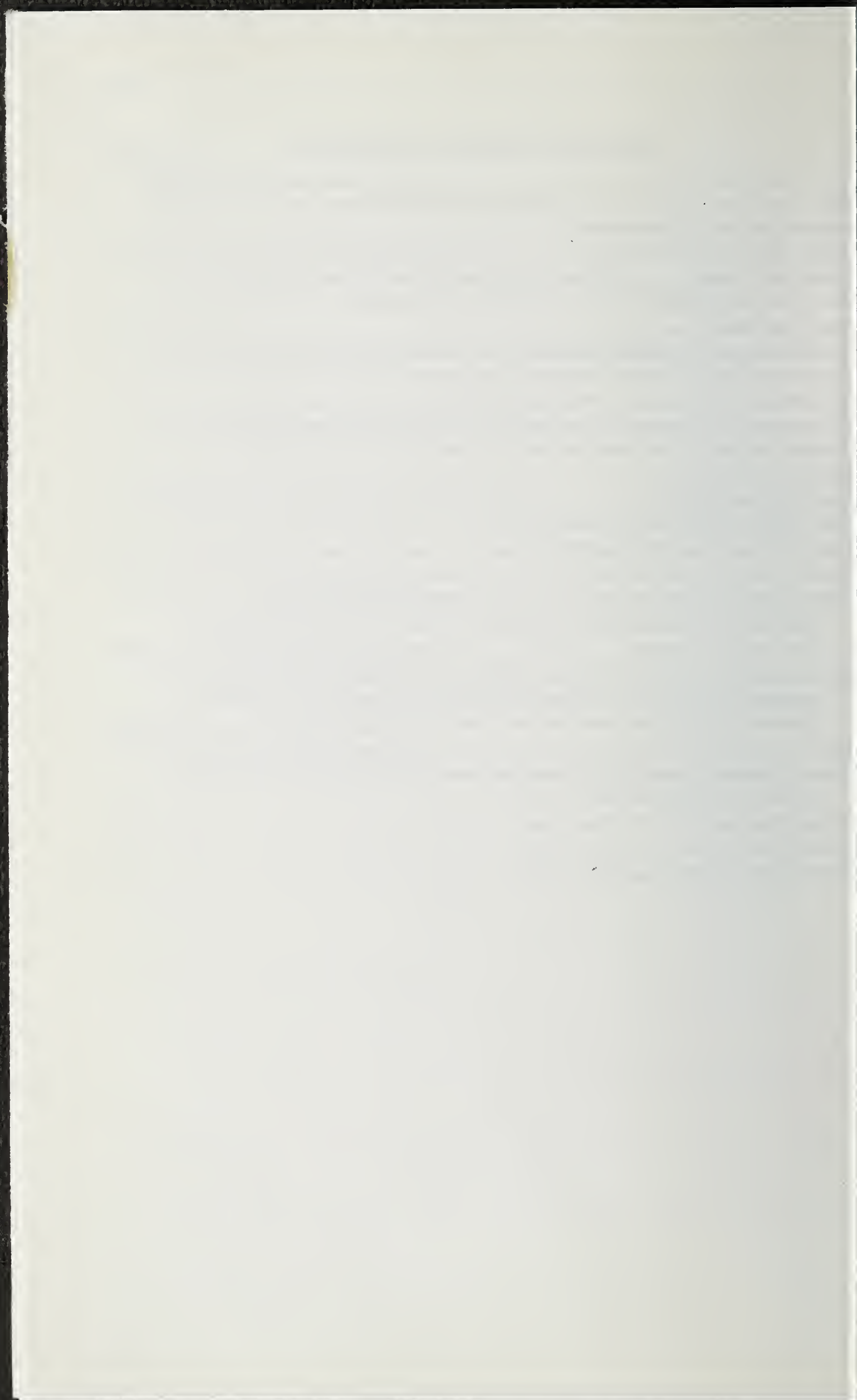
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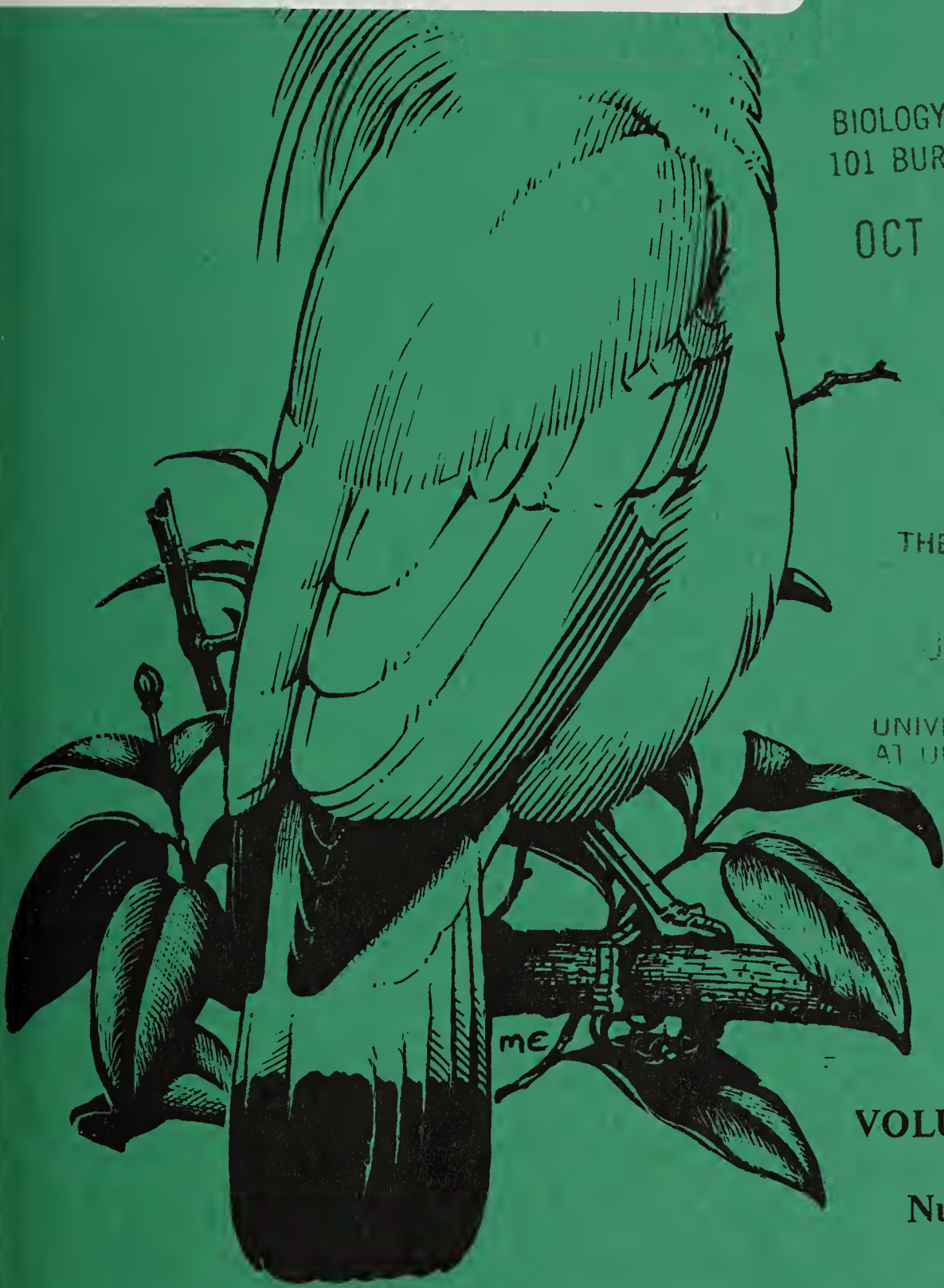
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THE AVICULTURAL MAGAZINE welcomes original articles that have not been published elsewhere and that essentially concern the aviculture of a particular bird or group of birds, or that describe their natural history. Articles should be preferably typewritten, with double spacing, and the scientific names as well as the vernacular names of birds should be given. References cited in the text should be listed at the end of the article. Line drawings should be in Indian ink on thick paper or card; photographs which illustrate a particular point in the article will be used where possible and should be clearly captioned.

ADDRESS OF EDITOR

Mary Harvey, Windsor Forest Stud, Mill Ride, Ascot, Berkshire, SL5 8LT, England.



Miss Ruth Ezra, President of the Avicultural Society, with the late Dr. Jean Delacour, President from 1972-1985, on the occasion of Dr. Delacour's 90th birthday celebrations at Miss Ezra's home.

AVICULTURAL MAGAZINE

THE JOURNAL OF THE AVICULTURAL SOCIETY

Vol. 92 - No. 1. *All rights reserved.* ISSN 0005-2256 JANUARY - MARCH 1986

DR JEAN DELACOUR (1890-1985)

It came as a great sadness to members of the Avicultural Society to learn that our President died on 5th November, 1985, in Los Angeles. He had been in failing health for some time, but retained his perceptiveness and sense of humour to the last.

For most of this century Jean Delacour played a unique role by being a prominent ornithologist, aviculturist and, latterly, conservationist, and he made a brilliant and sustained contribution to all the fields in which he participated.

He was born in Paris of a wealthy family who always encouraged his interests and he began collecting birds at the age of ten. By the time he was 15 he had one of the largest collections then in existence, established at his family's country house at Villers-Bretonneux. Following its destruction in the 1914-18 war, the collection was very soon recreated at Clères in Normandy in the grounds of the chateau which was to become his permanent base. Clères became world famous particularly for the collection of waterfowl which was one of the best and most extensive ever assembled. During World War II Jean Delacour again experienced the misery of losing his collection, which again he rebuilt with his characteristic enthusiasm when he was able to return to France from America where he had spent the war. He had by then become an American citizen and for the rest of his life he continued to spend most of the year in America, returning to Normandy each summer.

Between the wars Jean Delacour made many expeditions all over the world, studying and collecting birds and was appointed by the French Government to organise the zoological exploration of French Indo-China from 1923 to 1940.

In America he was appointed research associate at the American Museum of Natural History and Director of the Department of History, Science and Art at the Los Angeles County Museum.

He was a very prolific author, contributing many hundreds of articles

to various journals, including our own, and from 1920 to 1940 was editor of the French journal *L'Oiseau*. His books included: *Les Oiseaux de l'Indochine Française* (with P. Jabouille), *Birds of the Philippines* (with E. Mayr), *Birds of Malaya*, *Pheasants of the World*, *Guide des Oiseaux de Nouvelle Calédonie et de ses Dependances*, *Curassows and Related Birds* (with D. Amadon), *Birds of Malaysia*, his autobiography *The Living Air*, and the work for which he is probably best known, the monumental *Waterfowl of the World*, a complete survey of the family in four volumes.

He was President of many important organisations, in particular the International Committee for Bird Preservation from 1938 to 1958 where his twin roles of ornithologist and aviculturist enabled him to combine these interests with those of conservation.

Jean Delacour was always a great supporter of the Avicultural Society which he joined in 1916 (surely his must be the longest membership?) and contributed regularly to the *Avicultural Magazine* for the best part of 70 years. When he was elected President in 1972, he took a keen interest in the affairs of the Society and although he was unable to attend many Council Meetings, he always read the minutes that were sent to him and often undertook commissions for the Society on his travels. He was also a generous benefactor. In all, the Society was extremely privileged to have had such a distinguished friend as its President. Any time spent with Jean Delacour was always stimulating and enjoyable. We were honoured to have known him and will remember him with love and respect.

* * *

The Council has decided to dedicate a special issue of the *Avicultural Magazine* to Jean Delacour and contributions will be very welcome. We have already received some appreciations and no doubt more will be forthcoming, so in order to avoid inevitable repetition, it is proposed to assemble a compilation of extracts from all of them. In addition, we would particularly like to receive articles about various aspects of Jean Delacour's work and the birds and/or areas in which he was especially interested, possibly reviewing and bringing up to date his researches and writings. The Editor will be very glad to hear from anyone who feels that they can contribute or can suggest possible contributors.

MISS RUTH EZRA — PRESIDENT

At its meeting on 23rd February 1986, the Council unanimously elected Miss Ruth Ezra as our new President and we are very honoured that she has accepted this post as she has been one of the Society's greatest supporters and benefactors for many years.

Her father, Alfred Ezra, OBE, was one of the legendary names in aviculture and his collection at Foxwarren Park in Surrey was renowned throughout the world, many first breeding successes having been achieved there. Miss Ezra's connections with the Avicultural Society go right back to her early years at Foxwarren Park where her father invited members each year to visit the collection. She has continued this tradition at Chestnut Lodge, Cobham, where she entertains members each summer to see the magnificent collection of birds which she owns with Mr. Raymond Sawyer.

Mr. Alfred Ezra was President of this Society from 1926 to 1955; it is particularly appropriate that his daughter should now occupy this position and we welcome her as an old friend.

* * *

AVICULTURAL SOCIETY AWARDS

At the same meeting, Council agreed the following awards:

The Society's Medal (for the first known breeding of a species in Britain)

Mr. and Mrs. D. Lloyd-Roberts for successfully rearing the Golden-breasted Euphonia *Euphonia xanthogaster* in 1984.

Mr. and Mrs. B. Peck for successfully rearing the Grosbeak Starling *Scissirostrum dubium* in 1984.

The Certificate of Merit

Chester Zoo for the first known breeding in Britain of the Fire-tufted Barbet *Psilopogon pyrolophus* in 1984.

Rosemary Low for the meritorious breeding of the Tahiti Blue Lory *Vini peruviana* in 1984.

Hon. Secretary

REARING THE BROWN FISH OWL *Ketupa zeylonensis* AT THE PAIGNTON ZOO (Devon)

By MISS JO GREGSON (Head Birdkeeper)

There are four species of the genus *Ketupa* distributed from the Middle to the Far East but the Brown Fish Owl is by far the most widespread, four subspecies occupying a range from Israel in the west through India, Burma and Ceylon to China in the east.

It inhabits wooded country, seeking out overgrown ravines and steep banks near rivers and streams in which it catches the fish and crabs that form the main part of its diet, though small mammals and birds are also taken.

This very handsome owl is 22 in (0.55 m) long. The sexes are alike in plumage which is generally a reddish brown above, with black streaks and beige and white spots; underneath it is whitish with brown streaks and bars. Its feet and claws are especially adapted to catch and hold its slippery prey and resemble those of the Osprey.

In the wild, the breeding season is from December to March, generally in February.

This Fish-Owl was kept quite commonly in aviaries but the numbers have dwindled in recent years, probably due to the restrictions on importing and keeping birds of prey. This species has laid eggs in several collections but we believe that it has never before been reared successfully in Britain, though the closely related Javan Fish Owl *Ketupa ketupu* was bred at London Zoo in 1967 (*Avicultural Magazine*, 1968, pp. 17-18).

A male Brown Fish Owl had been in the collection here since 1967; in April 1981 it was paired with a seven-year old female received in exchange from 'Birdworld', Surrey.

The pair live in an unheated outdoor flight, constructed of 1 in (2.5 cm) chain link, laced on to a tubular metal framework, measuring 20 x 10½ x 10½ ft high (6.00 x 3.20 x 3.20 m). Aviary furniture includes natural perching, natural tree stumps, a large Bay shrub *Laurus nobilis*, and a raised feeding ledge. At the base of the shrub is a large water tray. A roofed, wood-partitioned area as wide as the aviary extends 5 ft (1.52 m) beyond the back of the flight. The roofing also projects forward some 5 ft in order to provide outdoor shelter. The nest-box 6½ ft (1.97 m) above the floor is positioned inside the partitioned area aligned with an access hole (for the owls) measuring 1½ x 1 ft high (0.45 x 0.30 m). Keeper access is by means of lower small hinged door. Since the aviary is sandwiched between other similar owl flights, there are two entrance/exits.

*Paignton Zoo*

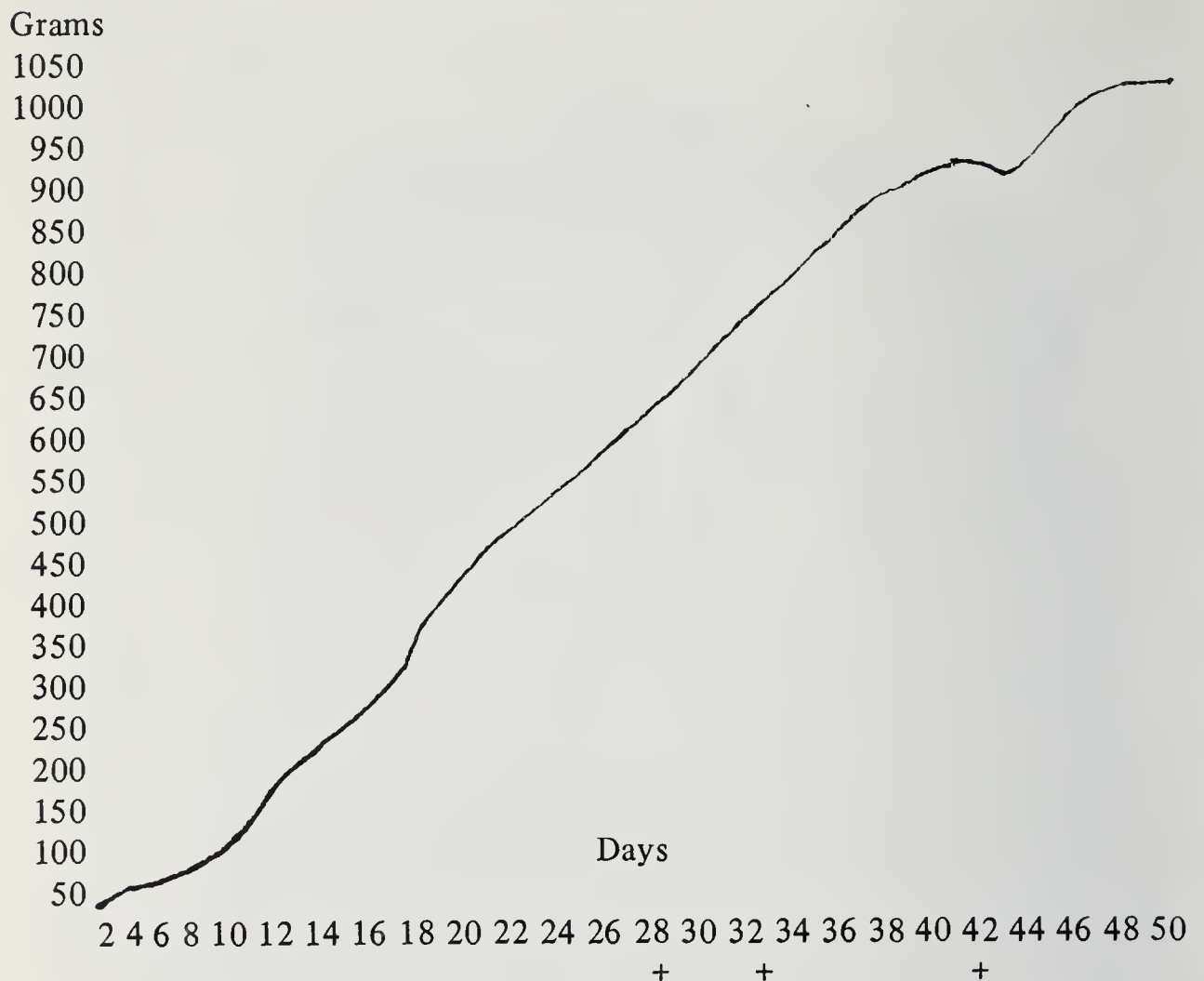
Brown Fish Owl at seven weeks

doors in either side as well as a seldom-used door in the front of the aviary.

In January 1982 the pair began to use an open-fronted nest-box measuring 30 x 16 x 24 in high (0.75 x 0.40 x 0.60) with a 6 in (1.82 m) upstand. A few days later one thin-shelled broken egg was found on the aviary floor. Despite constant improvements to the birds' diet, the clutches laid in 1983 and 1984 were both thin-shelled and broken. The nest-box proved unsuitable for the purposes of removing eggs undamaged and at the end of 1984 a newly-designed nest-box was fitted in the hope that we would be able to remove an egg before it was broken. The new box was open-topped and measured 24 in x 24 in x 12 in high (0.60 x 0.60 x 0.30 m), with a 12 in square front drop flap allowing easier access to the eggs. The floor of the box (drilled in places for drainage) was layered with peat and scattered with old pellets!

On 9th January 1985 one egg was removed for artificial incubation; a

DEVELOPMENT OF BROWN FISH OWL CHICK REARED AT PAIGNTON ZOO



Notes: The chick was moved from the keeper's home to the zoo on day 28.
It refused food offered by hand on day 33 and fed independently on day 42.

second egg had already been cracked and failed to hatch. The incubator was run dry until the chick had moved into the air space on 7th February. The next morning the chick had hatched. It was very strong with eyes partially open, but its navel had not yet healed. The chick may have escaped too soon from its thin shell and not had sufficient time for the yolk sac to be completely withdrawn into the abdomen. Fortunately after swabbing it with antiseptic, it healed over without any developing infection.

The chick took its first feed at midday. It comprised trout and soft pieces of mouse. Thereafter it was fed approximately every two hours from 7 a.m. to 11 p.m. each day and tweezers were used to hold the food; SA37, a vitamin supplement, was dusted onto one feed every fourth day.

For the first two days the chick was kept in the incubator, after which it was placed in a brooder. Two 60-watt light bulbs supplied ample heat.

The first small pieces of mouse bone were fed on the fourth day. Fur and feather were fed from the eighth day and fish were filleted before feeding. By day 15, the chick was covered in quills and therefore one

60-watt light bulb was exchanged for a 25-watt bulb. At 20 days it was beak clicking and hissing when disturbed, as a means of defence.

Much to everyone's surprise, the first pellet was not regurgitated until day 26 after which a pellet was produced almost every other day. Once we were sure it could pass pellets regularly, whole mice were fed.

Food was refused on the 33rd day and the chick became very excited, jumping out of its box, head bobbing, wings flapping and using its feet to hold food and tear up paper on the cage floor. It fed of its own accord for the first time on day 42. A few days later a large water bowl was placed on the cage floor into which it leaped almost immediately. Thereafter it remained in or around the bowl most of the time.

By day 48 the chick required no further heat. When it could perch confidently, it was moved to a large flight on day 81.

The juvenile bird sported yellow, turning to grey, down until it was replaced by the adult plumage.

As described above, the Brown Fish Owl *Ketupa zeylonensis* has been bred by Paignton Zoological and Botanical Gardens and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland or of any other reason that would disqualify this claim, is asked to write to the Hon. Secretary.

* * *

BREEDING THE BANK MYNAH *Acridotheres ginginianus* AND THE COLETO OR BALD STARLING *Sarcops calvus*

By R.F. RAYNER (London)

My collection consists chiefly of starlings though in the past I have kept lovebirds, seedeaters, small softbills, tanagers, etc., but as I work seven days a week I find that it is easier to keep the larger softbills with the limited time I have available.

I have been very successful with this specialised collection having reared the Spreo Starling, Coletto or Bald Starling, Rothschild's Mynah, Pagoda Mynah and Bank Mynah. Blyth's Mynahs, Pied Mynahs and Purple Glossy Starlings have hatched but deserted after one to 10 days. I have hopes for future success with Royal Starlings, Long-tailed Starlings, White-winged Starlings, Malabar Starlings, Dumonti's Mynahs, and Amethyst Starlings.

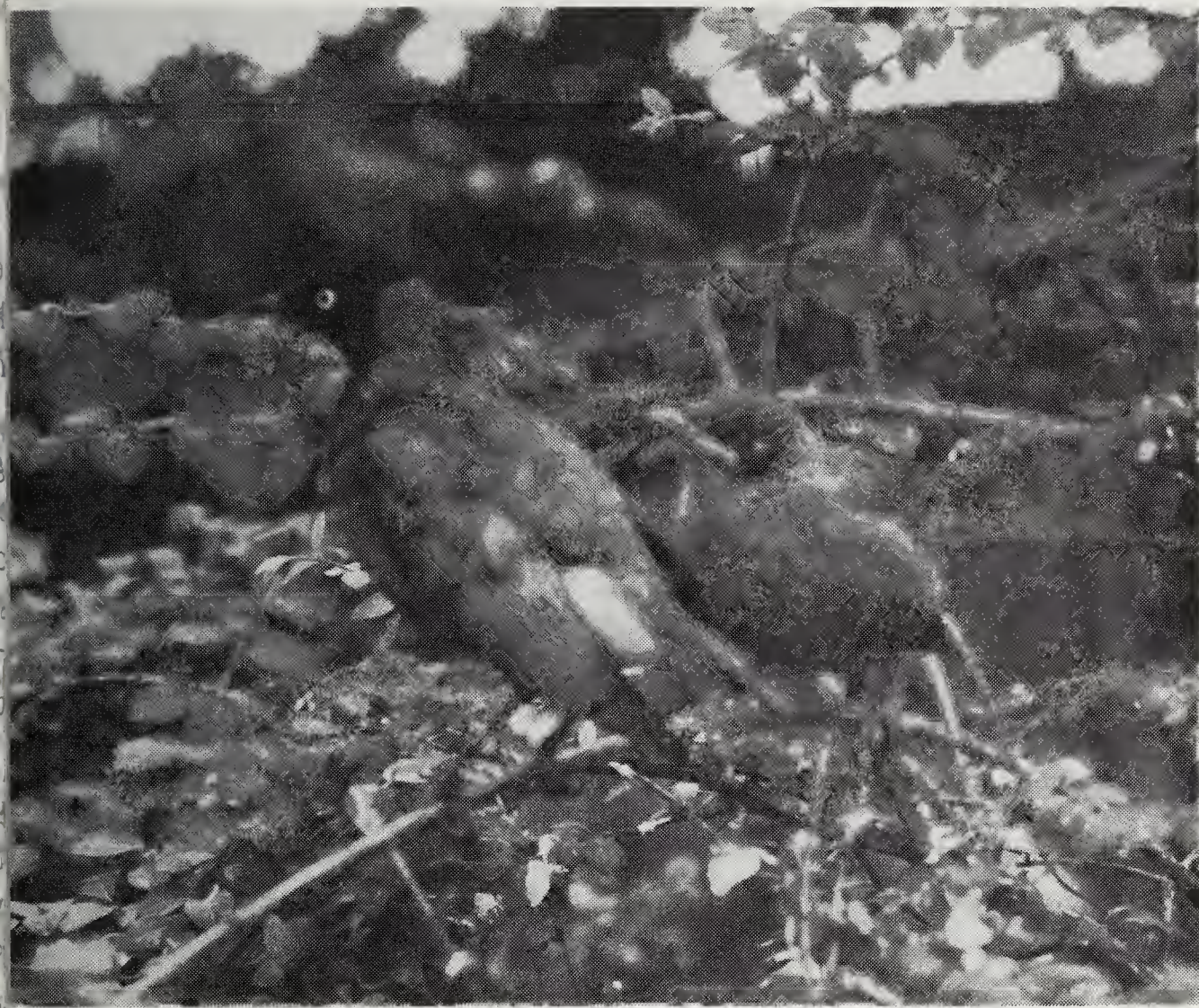
I no longer use artificial light or heat and my new flights have only a covered roof at one end with a drop of about 2 ft (0.61 m). Water is pumped through all the flights from a pond 8 ft (2.44 m) in diameter and 3 ft (0.91 m) deep. This saves work and ensures that the birds always have water, even in freezing weather. All the birds survived last winter which was very severe (except a sick Coletto) with no ill effects and indeed this year (1985) I have had my best breeding season.

Breeding the Bank Mynah

This bird comes from the plains of Northern India and looks very much like the Common Mynah and indeed the two species are often found together, though the Bank Mynah is more a bird of the open countryside and spends less time scavenging around human habitation than the Common Mynah. It chooses to live near rivers and nests in colonies in banks and cliffs over running water.

It is 9 in (0.22 m) long and the sexes are alike. The top and the sides of the head are black and the entire body plumage is slaty grey except for a pinky beige patch on the abdomen. The wing is black with a pinkish beige patch at the base of the outer flight feathers, and a similar patch is at the tip of the black tail.

My pair of Bank Mynahs were obtained in 1981 from a dealer who assured me that they were an 'unknown species' and that a well-known aviculturist had seen them and could not identify them. I travelled 150 miles to his establishment to be presented with two completely plucked birds, only their wing feathers and a few body feathers being present. I had



R.F. Rayner

Coleto with young

a strong suspicion that they were Bank Mynahs but was assured that the aforesaid aviculturist would have recognised that species. However, several months later and after a lot of care, I had two beautiful Bank Mynahs!

They were housed in a flight 8 x 8 x 3 ft (2.44 x 2.44 x 0.91 m) with a nest-box measuring 18 x 8 x 8 in (0.45 x 0.20 x 0.20 m) placed lengthwise at one end of the flight which was well planted. Their diet consisted of fruit, mynah pellets, mealworms and a homemade softfood mixture.

Although in the wild these birds nest several feet underground in river banks, I was unable to duplicate this although the entrance to the nest-box is through a 4 x 2 in (0.10 x 0.05 m) pipe. The birds laid their first eggs in 1982 but removed them and placed them undamaged on the floor at the opposite end of the flight. I placed these eggs under Spree Starlings but did not succeed in hatching them, or the eggs of subsequent years until this year. Two eggs were again removed whole from the nest (I have yet to see how the birds transport eggs over a distance of 8 ft [2.44m] without breaking them!). One egg was placed with a pair of Pagoda Mynahs sitting on several other eggs but it later vanished, possibly

eaten. The other was placed under a pair of Spreo Starlings. This pair consisted of a known hen that was at least 10 years old and a bird that I had bred in 1984 that I had hoped was a cock. There were already three eggs in the nest and on 17th July the parent birds were seen feeding. On 18th July the nest-box was checked and two chicks were seen. Obviously I had a pair. On 21st July one chick was thrown out. As the other chick had not fledged by 9th August (22 days) and my Spreos fledge between 16 and 20 days, I checked the box and saw that the chick was a Bank Mynah. Two days later it had still not come out, so I checked the box again and it came out (24 days).

The chick was very much duller than its parents, looking 'dusty'; the orange skin on the eye was hardly visible and the pink wing flash very insipid.

Mynah parents seem to feed only mealworms and crickets which I cover in a calcium-based supplement, and on the seventh day I worm the chicks by dusting the crickets with an anthelmintic powder. Since following these procedures, my success rate with softbills has greatly improved.

The foster parents of the Bank Mynahs had another round and reared two young of their own with the young Bank Mynah still in their flight. It seems no reverse imprinting had taken place as they had no trouble in rearing their own young. I have obtained another Bank Mynah which I hope to pair with my home-bred bird.

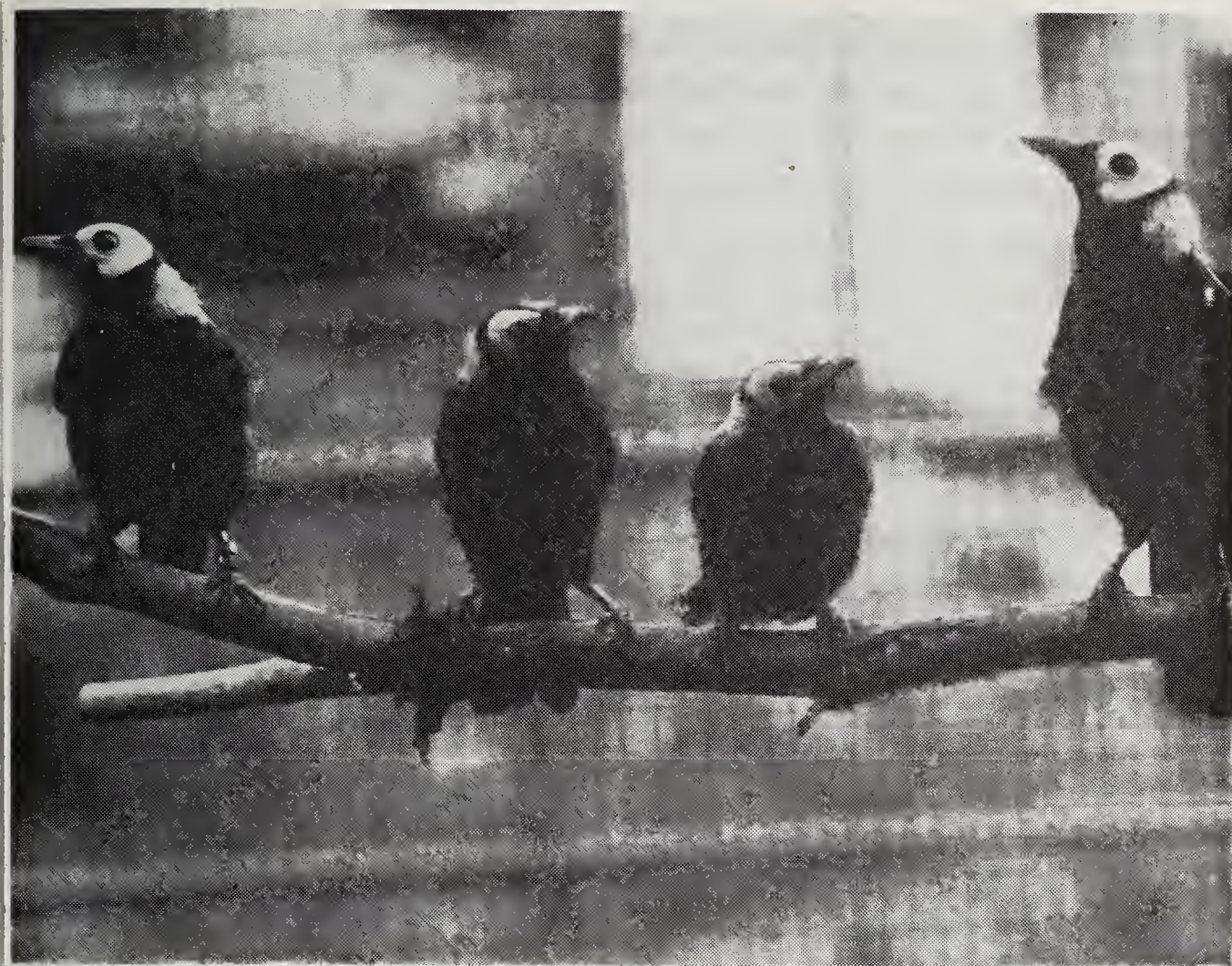
I have only found one record of a previous breeding of this species and that was at London Zoo in 1909.

Breeding the Coletos or Bald Starling Sarcops calvus

This species comes from the Philippine Islands and I understand that there is a slight variation in size from one island to another. As with most starlings the sexes are alike. There is an excellent plate of this species by H. Gronvold in the *Avicultural Magazine* of 1906 (pp. 191-192) showing the very characteristic ruff raised.

I obtained a pair that had been surgically sexed from a dealer in the winter of 1983/4 but the hen, which had never been a healthy bird, died in the following winter; no attempt at nesting had been made during 1984. In March 1985 I was fortunate enough to be present when two hens belonging to Mr. Raymond Sawyer were surgically sexed, and he kindly let me have one. He had had it for several years and it seemed to be different from my cock bird, being larger with slightly more silver on the neck.

The two birds were placed together in a flight 12 x 3 x 8 ft (3.66 x 0.91 x 2.44 m), covered at one end where there is a nest-box 16 x 8 x 8 in (0.40 x 0.20 x 0.20 m) with a 2 in (0.05 m) entrance hole. The floor is



Spreo with young Bank Mynah

R.F. Rayner

of earth, covered with grass, and there is a small conifer at one end. Knowing the aggressive reputation of these birds, I was slightly apprehensive at the introduction but no attacks were seen. The cock bird immediately began to strip the conifer of all its leaves which, in fact, killed it. Both birds then began to tear the grass from the ground, pulling it out by the roots, ignoring hay and canary nesting material. The cock seemed to do most of the nest building and the box was filled to the entrance hole. I saw no mating take place but after about two weeks the cock bird remained in the nest box for hours at a time and during the following 10 days I only saw the hen enter the box once. From their behaviour, I came to the conclusion that perhaps I had two hens. On 21st April I checked the box and there were three eggs which were blue speckled at one end. Though I was convinced that both birds were hens, two days later two of the eggs were ejected and both were fertile.

On 24th May, eggshells were seen in the flight and the cock bird was seen taking mealworms into the nest. The hen rarely went into the box, and I estimate that the cock did 90% of the feeding. I gave the birds

mealworms, crickets, fruit, softfood mix and mynah pellets but only live food was fed to the chicks during the first week. I had several nests of softbills at the time and on 30th May a handful of well-cleaned maggots was added to about 2 lbs of mealworms and fed to all my birds with young. The following day a dead Coletto chick was found on the aviary floor. As this is quite a common occurrence with softbills, no significance was placed on this. The cock bird continued feeding so I knew that there were chicks still in the nest. The following day the hen was on the floor unable to fly with no control over her head or wings. I realised then that the cause was probably botulitis which I had heard about but not previously encountered. The cock bird seemed unaffected, although he showed signs later, and I decided to remove the chick and the hen. The hen remained incapable of feeding itself or even moving for seven days. Although there is an antitoxin, which I managed to trace three days later, I was told that it must be given within 24 hours of the symptoms appearing. I had treated the hen with aluminium hydroxide which was supposed to 'mop up' the toxin and I was assured that the toxin would leave the system provided that I could keep the bird alive. I force-fed it for seven days and on the eighth day it recovered completely.

In the meantime, the chick that I estimated to be about six to seven days old showed no signs of poisoning but as a precaution I started dosing it with aluminium hydroxide. I could find no guidance as to dosage but after three days the chick's droppings were very loose and I stayed up all night worrying. I stopped giving the aluminium hydroxide. The chick was fed crickets and mealworms covered in the calcium-based supplement. It would not gape but I found out accidentally that sneezing caused it to gape, so I faked sneezing for two days before discovering that whistling gave the same result! The crickets had to be completely dewinged and delegged before feeding. I fed on demand, which seemed continuous, starting at about 6 a.m. and finishing at midnight. The bird was kept in the house in the airing cupboard at a temperature of about 70°F, transported to work surrounded by tissue and with a hot water bottle, and placed in a hospital cage set at 80°F during working hours.

At seven days old the chick was naked but the pink head could be seen clearly; growth was rapid and the wing feathers were beginning to show at 11 days; by 21 days the bird was fully feathered. I introduced minced beef and apple at 15 days. As I have lost several chicks with gape worm, I dosed the bird at 15 days with a suitable anthelmintic. Although the chick seemed to be developing very well, I was slightly concerned that at 20 days it still remained on its hocks. I ground up two calcium lactate tablets which I mixed with its food. At 22 days it was perching perfectly, and at 28 days it was feeding itself. I continued to offer it mealworms which it

took from my hand with no fear but about three weeks later it refused them and stayed away from me, becoming increasingly timid; it is now completely wild when approached. This is in complete contrast to the other softbills that I have bred which seem to get tamer the more contact is made. Since then, two further Coletos have reacted in the same manner and although I have kept them in 2 x 2 x 4 ft (0.61 x 0.61 x 1.22 m) cages, they remain completely wild.

After the hen had recovered, I replaced her with the male and on 28th July the cock bird was seen feeding. This time the parents successfully reared two chicks which left the nest on 25th August. The young are the same colour as the parents and although slightly smaller, and the silver ruff less pronounced, the feathering does not look very juvenile. The chicks were removed on 11th September. On 18th September the nest-box was checked and two eggs were seen. On 3rd October, the behaviour of the parents aroused my suspicions and on checking the nest-box I found two dead chicks.

It seems that if compatible, these birds will nest several times a year and should be readily established in captivity. Because of their aggressive nature, I would recommend that they are best kept in a flight by themselves. The young Coletos began to fight at about two months old and are now housed singly.

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BREEDING THE CRESTED WOOD PARTRIDGE
or ROULROUL *Rollulus roulroul*
AT THE PADSTOW BIRD GARDENS, CORNWALL

By ANDREW OWEN AND RICHARD HUGHES

The Crested Wood Partridge, also known as the Roulroul Partridge, is probably the most attractive member of its family. The male is dark blue on the breast merging to green on the back and its most outstanding feature is its white crown and upright red crest. The female's plumage is mainly green with grey head and rich chestnut wings. The legs and feet of both sexes are reddish. Both sexes are about 10 in long (25.4 cm).

It is found in tropical forests and bamboo thickets up to 3,000 ft (914 m) throughout Sumatra, Bornea, Thailand peninsular and Malaya (King and Dickinson, 1975).

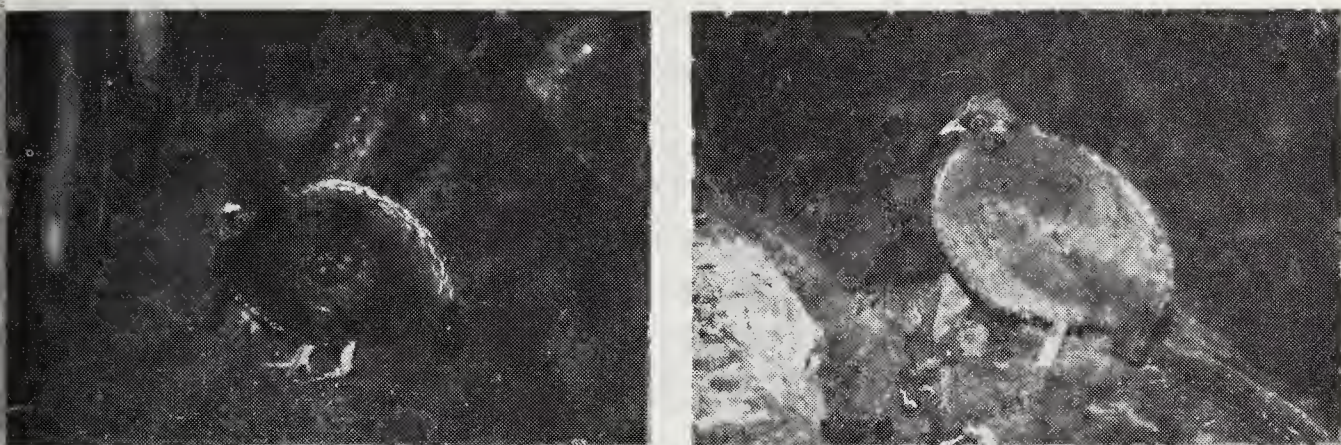
A pair of these birds is housed in the Tropical House here at Padstow Bird Gardens. Other ground-dwelling birds in the Tropical House include a pair of Northern Jacanas, Black-winged Stilts, Golden Heart Doves and a Spur-winged Plover.

The diet for the Crested Wood Partridges consists of insectile food, chopped fruit, cress and live food (maggots, mealworms, crickets); they are also given Haith's Java Dove Mix. They spend most of the time foraging among the leaf litter for insects and other invertebrates, and are particularly fond of large house spiders. Constantly calling in a soft mellow whistle, they are seldom apart.

During the spring (1985) the Plover and Stilts were removed from the Tropical House to an outside flight as they were showing signs of aggression towards the other ground birds. Shortly afterwards the Partridges began to nest.

The female dug a scrape under a low fern. The male would carry rootlets and leaves towards the scrape, turn, and throw them over his shoulder where the awaiting female would place them around her, forming a dome-shaped nest (a characteristic of this species). The nest was finished within two days. Mating was observed once prior to nest-building.

The female began to sit once the nest was complete. Once inside the nest she would place dead leaves and plant fibres over the entrance to conceal herself and to make the nest less conspicuous. It was not until six days later that the clutch of three white, almost round eggs were seen. On the rare occasions that the female left the nest to feed she would replace the plant matter over the entrance, quickly returning at the slightest disturbance in the Tropical House. The male apparently took no part in the in-



Andrew Owen

Adult male (l) and female (r) Roulroul at Padstow Bird Gardens

cubation of the eggs.

After a further six days the female deserted the nest due to some unknown disturbance. The eggs were left in the nest for several hours, but as the female did not return they were removed and placed in a small Curfew incubator at a temperature of 99-100°F.

The eggs hatched after a total incubation period of 17 days. The eggs began pipping at approximately 8.0 a.m. and hatched at 3.15 p.m., 7.15 p.m. and 2.30 a.m. respectively. Upon hatching the chicks seemed uncomfortable at the above temperature so it was lowered to 97°F.

The chicks were covered in chocolate-coloured down and were extremely vocal, continually calling to one another. They dried out after about four hours and by this time were very active, therefore a cardboard wall was put around the incubator to prevent them from escaping.

The chicks were given their first feed 12 hours after hatching. This consisted of tiny stick insects and very small pinky maggots. These were fed from a pair of tweezers gently tapped on the ground in front of the birds. We had to persevere before they finally accepted the food. A shallow container of water was placed in with the chicks which they drank from readily.

For the first day they were fed at hourly intervals as very little food was taken at each feed.

The youngest chick died within a day of hatching due to unknown causes.

The two remaining chicks progressed well and began to accept food more readily and the distance between feeding times was, therefore, lengthened to two hours. At this stage a shallow dish containing chopped cress, hard-boiled egg and maggots was provided, though very little interest was shown in this.

The temperature in the incubator was now reduced by a few degrees each day.

All went well for the next two days until the legs of one chick started to splay. We tried to correct this by covering the floor with a damp cloth in the hope that this would improve its condition. Unfortunately, it deteriorated and at five days old was very weak and unable to stand and support its head; it was, therefore, destroyed.

The remaining chick continued to thrive and at seven days old the wing feathers started to appear. At night the chick was very restless and was constantly calling so a cardboard box was provided for it to roost in. This did not completely solve the problem so we tried putting a small furry toy (of similar size) into the box. This seemed to do the trick as the chick was much quieter and more contented.

By 11 days old its wings were larger, it had the beginnings of a tail and was growing rapidly. At this stage it was removed to a box cage measuring 3 ft x 1 ft x 1 ft (0.92 x 0.31 x 0.31 m).

A week later the chick was still growing well, measuring about 6 in (0.15 m) and was a reasonable flier, capable of flying the length of the room. By this time it was feeding on its own although still accepting maggots from the tweezers.

At 20 days some green feathers began to appear on its rump and back, and some silvery green feathers were also seen on the breast, thus we had the first indication of its sex (a female).

After a few more weeks, the chick became too large and active for the cage, so it was then removed to a larger indoor holding flight.

During the next three months she gradually attained adult plumage. By this time she was feeding on an adult diet. Although remaining tame, the young Partridge has not become imprinted as we first feared.

This was the first breeding of this species in the Gardens and we hope for more success in the future.

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BREEDING BEHAVIOUR OF CRESTED WOOD PARTRIDGES IN CAPTIVITY

By G.W.H. DAVISON

(Zoology Department, Universiti Kebangsaan Malaysia)

The wariness of tropical rainforest pheasants and partridges, as well as their densely vegetated habitat, has greatly restricted studies of the wild birds. Observations in captivity have correspondingly had more importance in understanding their behaviour. The Crested Wood Partridge *Rollulus roulroul* is one such species, being one of the few partridges of tropical evergreen forest to breed rather freely in captivity. Data presented here, from observations of captive birds, show that this species has unique behavioural adaptations, notably in relation to breeding. These adaptations are in strong contrast to the behaviour of similar-sized temperate game birds.

Crested Wood Partridges are patchily common in lowland and hill evergreen dipterocarp forest, in the Malay Peninsula, Sumatra and Borneo. The sexes are highly dimorphic in plumage (Robinson and Chasen, 1936) but not in size, both weighing around 280g. Nesting in the wild has been described by Ogilvie (1949) and by Coomans de Ruiter (1946); other details of the species' behaviour are given by Robinson and Chasen (1936) and by Medway and Wells (1976).

Methods

The following observations were made on 10 pairs, variously accompanied by their offspring, at the National Zoo, Kuala Lumpur. Each pair was kept in visual, but not vocal, isolation, in cages ranging from 4 m² to 90 m². Behaviour of individual birds within larger flocks was observed in captive groups of up to 12; wild birds were also observed ranging from solitary individuals to large flocks.

Pair bonding

Mean group size in the wild was 2.67 (average of 60 sightings), ranging from one to 13 birds. The commonest sighting (27 times) was of an adult pair, followed by sightings of singletons. All birds in wild flocks keep in contact through continual soft chirping, but normally distinct pairs are discernible within the larger group. This is evident when flocks are disturbed and split up into their constituent pairs, or when on occasion a flock cautiously crosses a forest trail pair by pair, or when in a foraging group each pair feeds slightly apart from the remainder. Most often simi-

lar numbers of males and females make up the flock, but occasionally there is a strong bias: once a flock of 12 males was seen.

Pair formation within a flock takes place when a male begins courting a particular female. A large part of this activity consists not of displays, in the sense of postures having a special visual impact, but of 'cutting-out' movements, by which the male attempts to isolate a female from the rest of the group. In particular he continually interposes his body, with lowered head, whenever the female approaches another male, walking parallel by her side and sometimes touching.

Throughout pair formation and the subsequent bond, much play is made of the rapidly vibrated tail which in this bird is short and downwardly directed. Once the pair is formed, the male generally follows wherever the female leads, and it is she who performs the majority of tail shaking.

Displays

Through pair formation and thereafter, the male and female spend their time in close proximity, whether moving about or resting. Much of the time not spent in foraging is devoted to preening. In the male, active and jerky movements of the head while preening the upper and under surfaces of the body and wings, switching rapidly from one part of the body to another, make the deep red crest very conspicuous. Whether these preening movements are ritualised to a point at which they have display function is an arguable point.

Much more typical of partridge displays is a stretched lateral posture. The male, standing usually alongside the female and parallel to her, straightens his legs so that his body is raised up. There is little accompanying change in feather posture, but a major effect of the display is to emphasise the red legs.

Courtship feeding or tidbitting is very common, when the male picks up any piece of food, especially animal food, and twitters until the female comes and takes it from his bill. Sometimes he twitters and adopts the head-forwards posture without holding anything, and if the female responds she pecks preferentially at the red patch on the male's bill.

Two other displays bear no parallel amongst game birds. On occasion the male will run just behind or alongside the female and, as soon as she pauses, will put his head under her breast, abdomen, or under tail-coverts and press upwards. This can only be understood in relation to the behaviour of the chicks described later. Sometimes too, while running alongside, the male will crouch, lower his head and beg with open bill while twittering. Although all males performed this display, no female was ever seen to respond by giving the male food.

Nest-building

Both sexes participate in building the nest, using sideways-throwing and sideways-building techniques. One bird will enter the chosen nest space and sit there while pulling in leaves from within reach, tucking them down the sides of the body. It will, after a time, emerge and walk away from the nest throwing leaves or twigs backwards over its back. As this bird emerges, its partner enters the nest and begins sideways-building. Thus in periods of intense activity there is a continuous cycle with one bird in the nest and one walking away, only to switch places as the nest occupant emerges. Entry into the nest and turning within it form the central nest chamber, while the high level of activity results in a large mass of leaves forming a complete dome.

This system should encourage similar levels of participation from the two sexes, but in fact males generally expend more time building than their mates. Females cease sideways-throwing sooner while walking away, and more often miss out their turn to enter the nest. On average males put about twice as much time into nest building as females do, as the following figures show.

		Mean time per session in nest (seconds)	Mean time per session walking away (seconds)
Pair 1	Male	106.3	38.7
	Female	60.0	21.0
Pair 2	Male	133.4	194.3
	Female	66.5	23.0

Chick behaviour

The most noticeable feature after hatching is the great care paid by both parents to the chicks. This is manifested in various ways.

After hatching the brood splits between the parents. If only one chick hatches from a clutch it is tended by both parents (not always to an equal degree), but in larger broods about half go to each, and each parent restricts its care very largely to its own set of young.

The chicks take food mainly from the attendant parent's bill for the first few days; the parent picks up a fragment, and may call, whereupon one or more chicks peck at the held food. This behaviour gradually declines in favour of the chicks picking up food for themselves at scrapes made by the parents. At the same time chicks learn to scrape for their own food, beginning within the first week of life, and at least by the eighth week most food comes by this means. Nevertheless, depending on the behavioural state of the parent, odd items may still be obtained from the

parent's bill even up to six months old, when the young are full-sized and in adult-like plumage.

Gaping for food occurs, and this exposes the skin within the mouth which is bright yellow in the chick (but pink in the adult). A gaping chick crouches slightly and lifts up its widely open bill while cheeping. Although this behaviour was seen many times, on no occasion did either parent place food within the chick's mouth. But it seems logical to suppose this does sometimes happen, otherwise the behaviour seems pointless and is difficult to account for. It would be difficult too to explain the evolution of the colour signal within the chick's gape. Gaping is not a common behaviour, though every chick performs it, and it becomes positively rare after the fifth week.

Chicks in less active periods solicit brooding from their attendant parent; the female responds more often than the male. Brooding is solicited by a chick walking under the parent and pressing upwards with its head, back and lifted wings, exerting pressure by straightening the legs as well as wing lifting. This pressure seems to induce the brooding response (crouching) in the parent. As the chick grows it is less able to burrow beneath its parent and upward pressing is done mainly with the head, inserted under the parent's breast, abdomen or tail-coverts.

Discussion

These observations raise some general points about the reproductive behaviour of the species. Chick care is multifaceted, and exceeds that known for any other galliform. The male parent takes an equal share in the breeding cycle as a whole; although he does not incubate he expends time and energy in courtship feeding, which is a direct input of nutrients to the female and hence to the eggs she will lay.

Gaping by chicks is quite unknown in other galliforms. It is worth further observations to see whether this ever does stimulate the parent to place food within the chick's mouth. Stable division of the brood between the two parents has also not been reported for other species. The amount of food-finding by the male, and the amount of brooding he performs, are unusual features. So too is his heavy role in nest building.

The level and type of chick care are of interest again in relation to the displays of the adult male. Tidbitting is widespread, perhaps universal among galliforms, and is thought to be a ritualisation of parental feeding (Stokes and Williams, 1971). But in the Crested Wood Partridge two other displays are related to a similar phenomenon. Gaping by the male, and his insertion of the head beneath the female, are almost identical to gaping and brooding-solicitation by the chicks. Though ritualisation of parental behaviour to form displays is a common occurrence, the ritualisation of

chick behaviour into courtship is unique to the present species.

These observations have some relevance to the captive breeding of tropical galliforms. It is common practice to increase output by removing and artificially incubating first clutches or all clutches. This process is very effective when applied to temperate zone species. But the Crested Wood Partridge is an extreme example of the general truth that tropical game birds have more elaborate chick care. Artificial incubation deprives the chicks of this care, and a long term strategy for their captive breeding might be to leave eggs with the parents. This would result in lower production rates but better care of chicks, and chicks with broad social experience. Such parent-reared chicks are themselves more likely to be competent breeders in future.

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THE PARTRIDGES OF THE GENUS *ALECTORIS*

By DEREK GOODWIN

(Petts Wood, Kent)

I apologise for putting a 'Latin' name in the title but, unfortunately any possible English name for the group is also the specific name of one of its members.

Introduction

The partridges of the genus *Alectoris* are perhaps best typified by the Chukar *A. chukar* and the Red-legged Partridge *A. rufa*, one or other of which is likely to be familiar to most of my readers. To those to whom they are not, I'd better say that they are a shade larger and more robust in build than the Common Partridge *Perdix perdix* or Indian Grey Partridge *Francolinus pondicerianus* and about a third larger than a Bobwhite *Colinus virginianus*.

They are all extremely beautiful birds, characterised by having red bills and legs, red or pink orbital skin around the eye, a distinctive face, neck and throat pattern in white or cream and black or (one species only) grey and chestnut, strikingly barred flanks and the upperparts some shade of brown, fawn or grey without any markings other than, in some species, a broadly laced pattern on the scapulars. Most have chestnut outer tail feathers. The sexes are alike except that the males are rather larger and usually have wart-like 'spurs' on their legs, although it is said that some hens have these and certainly in *A. rufa* some cocks do not. The juvenile birds are very different in colour and pattern, being much more like *Perdix*.

They are all closely related and similar and under natural conditions are either completely allopatric or, where two forms do appear to overlap 'on the map' they are usually known or believed to be separated by living at different altitudes.

Some authorities have treated the Chukar, the Rock Partridge *Alectoris traeca* and the Large Rock Partridge or Przewalski's Partridge *A. magna* as members of a single species. However, Watson (1962) gave what seem to be valid reasons for treating them as separate species, although he perhaps over-emphasised some of the slight plumage differences. In any case most writers now treat these as three species and it is preferable to do so unless proof to the contrary turns up.

The Black-throated Chukar or Philby's Partridge *A. philbyi* is also sometimes treated as a race of *A. chukar* but, like Harrison (1982) I con-

sider it best given specific rank.

The three remaining species are the Arabian Partridge or Arabian Red-legged Partridge *A. melanocephala*, the Barbary Partridge *A. barbara* and, perhaps most beautiful of all these exquisite birds, the Red-legged Partridge, long (but perhaps not to be much longer!) familiar as a successfully introduced species in central-eastern and south-eastern England.

Alectoris is a very distinct genus. Its nearest relatives are probably the sand partridges of the genus *Ammoperdix* and, more distantly, the much larger and duller snowcocks *Tetraogallus*.

The *Alectoris* partridges inhabit rocky, rather arid, and usually hilly or mountainous areas, with a preference for warm, south-facing slopes. Sometimes in places with bush or tree cover but not in dense woodland or flat open country far from any cover. Like most other gamebirds that live on hills or mountains, they tend to walk or run uphill away from man or other predators but in emergency to fly downhill. Their flight, like that of most gamebirds (and ground-living pigeons) consists of alternate periods of violent wing beating, interspersed with long glides. They are not so completely terrestrial as the Common Partridge *Perdix perdix* as they often perch on rocks, walls, dead trees, buildings, etc.

Some, and perhaps all of these partridges have the habit, unique among gamebirds so far as is known, of both cock and hen of the pair sometimes or usually incubating a nest of eggs. If feeding and other conditions permit, the hen lays two 'clutches' of eggs or, to be more precise, she lays about half of one large clutch of 15, 20, 28 or more eggs in one nest and the others in a second nest. She starts to incubate on the second nest when it is full and, when she does so but not before, her mate returns to the first nest and starts to incubate the eggs there, if they have not, in the meantime, been discovered and eaten by some predator. If they have been, or if the hen lays only one nestful of eggs before beginning to sit, the cock joins up with other males who also have no eggs to sit on. In some cases, at least for some species, cocks are said sometimes to re-join their mate and her chicks when the latter are partly grown. In other cases, and usually with the Red-legged Partridge at least, a brood of chicks is reared by mother *or* father alone

This behaviour is well documented for the Red-legged Partridge in England, both in captivity (Goodwin, 1953) and in the wild (Green, 1981 and 1984; Jenkins, 1957). It is said (Cramp *et al*, 1980) sometimes to occur in the Rock Partridge, although Menzendorf (1983) says there is no evidence for it in this species. Cock Chukars have also been known to incubate nests of eggs and rear chicks in captivity (Portal, 1924) and a cock with a brood patch has been shot in the wild in the Aegean Islands (Wettstein, 1938). Menzendorf dismisses male incubation in this species with

the statement that possibly occasional males may incubate deserted clutches (*verwaiste Gelege*). This seems to be unlikely because, on 'selfish gene' principles, such behaviour could hardly be selected for unless he incubated only clutches deserted by his *own* mate. Even if he did, it would be a risky business as the commonest cause of nest desertion is because the sitting bird has had a narrow escape from a predator, who might well have 'better luck next time' if the deserter's mate took over.

I think those who, like Menzendorf, doubt the occurrence of male incubation in these partridges under natural conditions, may be unduly influenced by having had captive males that did not incubate when given the chance. However, it is well known that female ground nesting gamebirds (and also *ground nesting* pigeons!) very often nest and lay but refuse to incubate under captive conditions. So it should cause no surprise if under captive conditions some male *Alectoris* partridges fail to incubate their mates' first nests. That *any* do so argues cogently, in my opinion, that the habit is (under appropriate conditions) normal to them. As the Heinroths, with their incomparable experience of bird keeping, pointed out (I think in their classic book *Die Vogel Mitteleuropas* but am not sure of this), when speaking of nest site selection by drakes, the fact that a bird does *not* perform some piece of behaviour in captivity is no proof that it never does so in the wild but the performance of any complex piece of reproductive behaviour in captivity *is* proof that it is part of the species' repertoire in its wild state.

My own opinion is that it will ultimately be found that, where feeding conditions and other circumstances are favourable, the hens of most or all *Alectoris* lay two nests full of eggs, one of which the cock incubates when the hen has begun incubation on the second, but that in many circumstances the food available, the amount of time available before incubation must begin if the young are to be reared successfully, or other factors, preclude the hen from laying more than one 'clutch'. Possibly (but this is a mere guess) if the hen is killed when she has laid several eggs but before she has begun to incubate, the cock will then incubate these eggs, at least if there is not an unmated hen around to distract him from them.

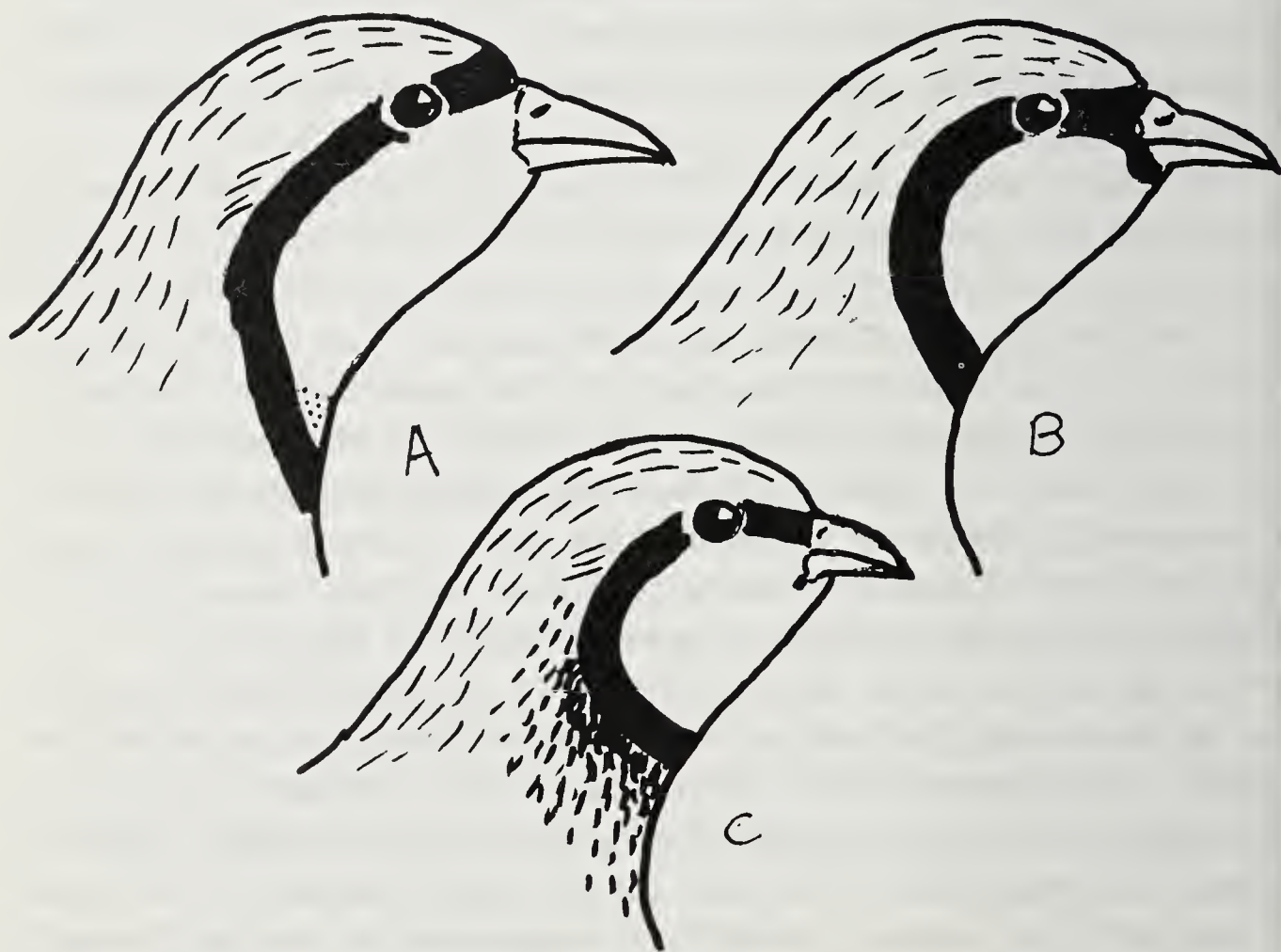
So far as I am aware, there is little or no evidence for male incubation or, for that matter, any detailed studies on breeding behaviour in the other species. A cock Barbary Partridge (Debeno, 1933) incubated the only nest of eggs that his mate produced but as she took a surprisingly long time about this, perhaps he realised that the eggs would not keep much longer if not sat upon. After incubating for some time, he attacked his mate fiercely but when she was removed sat peacefully again and was a model father to his chicks.

I hope that some of my readers will be able to give further information on this interesting subject.

Notes on the species

The Chukar

This is the most widespread and almost certainly the most abundant species. It is also more easily, or perhaps one should say even more easily kept and bred in captivity than its congeners, in which state it has almost certainly been kept as early as the Bronze age (Watson, 1962). It is found from eastern Greece (Thrace) and Crete through Turkey, Syria, Lebanon, Sinai, Iraq and Iran, Afghanistan, northern India and nearby areas through much of central Asia to north-eastern China. It has been introduced as a 'sporting bird', for the pleasure of those who enjoy killing beautiful, sentient creatures (unfortunately a much larger and hence more powerful number of people than those who enjoy watching birds or keeping them), to many countries and appears to be well established in parts of the western United States and in New Zealand. It has also been introduced into various parts of England, about which I shall say more further on in this article.



Diagrammatic sketches to show differences in face and throat pattern between:- a) Chukar *Alectoris chukar*; (b) Rock Partridge *Al. graeca*; and (c) Red-legged Partridge *A. rufa*.

The Chukar inhabits a wide, or at least fairly wide range of habitats, typically on or near rocky hillsides, mountain slopes or valleys, ranging from the snow line, or just below it, down to hot deserts. Sometimes in clearings in forest or in open, grazed woodlands with some rocks or boulders. It is said (Cramp *et al*) also to inhabit open plains and flat desert but I suspect it only does so where there is some rocky ground or scrub fairly near.

In describing this and the other species I shall here give only the main features and not attempt a detailed description. When describing feathers I shall ignore the fluffy basal portion of the feather that is not normally visible and not repeat the description of the bill, legs and orbital skin which have already been given. As with many other birds, especially those that have subtle pastel shades, no words and few paintings or photographs can give an adequate impression of the extreme beauty of these birds. The bird and living bird must be seen at close quarters for this to be fully appreciated. This is not always easy as, because more people shoot partridges than want to look at them, they are almost everywhere much afraid of man in their wild, or feral state.

The Chukar's upper parts are predominantly olive brown to pale pinkish fawn, more or less shading to pale grey on the crown, neck and rump. The sides of the breast and the scapulars are pale bluish grey with broad pinkish fawn, mauvish pink or salmon pink borders to the feathers. The front of the breast is pale grey, the belly and under tail covert buffish. The face and throat pattern (see sketch) is black surrounding dull cream or dingy off-white, often with a dusky smudging or speckling in the cream colour at the lowest point (the pale part) of the bib. There is a tuft of hairy reddish brown feathers over the ear openings and a conspicuous white or greyish white stripe above and extending beyond the eye. The outer tail feathers are pale chestnut. The barred feathers on the flanks are pale bluish grey at the base, then come two rather narrow black bands with a wider buff or cream band between them (see sketches) then a final and narrow fringe of dark chestnut.

The above is a generalised description. Many geographical races of this species have been named on usually rather small differences of shade of the upper parts and the width of the buff band on the flank feathers. In general, Chukars from hot, arid regions are paler and pinker in colour (and in my eyes, therefore, more beautiful) than those from less arid regions. They also bleach even more quickly and the differences due to plumage wear can be very striking indeed. I have handled and examined many museum specimens, collected when moulting, in which the new feathers on the back are deep olive brown and the old ones that they are replacing are a very pale dusty cream colour. Every British bird watcher who takes

note of the common birds (and that is far from *every* BBW, I fear) knows how our Mistle Thrush *Turdus viscivorus*, when in fresh plumage in early autumn, has dark olive brown upperparts (slightly paler and more greenish on the rump) and a deep golden (dark-spotted) breast which, by the following May, have usually become, respectively, pale dingy greyish and white. The Chukar's usual colour changes are similar and just as great.

There are two very nice colour pictures of the Chukar in Jonsson (1982), a good colour photograph in Nicolai (1982) and some excellent 'action photos' of captive birds performing various displays in Stoke's paper on the species' behaviour.

From what I have read, the voice and displays of this species would appear to be very similar but not identical to those of the Red-legged Partridge (Goodwin, 1953). A most noticeable possible difference is that in the threat or sexual display in which the Red-legged Partridge 'twists its face round' in a remarkable way, the Chukar would appear to do so to a relatively very slight extent, if at all. At least so it seems from Stokes' pictures and descriptions and so it was on the only two occasions that I have seen this display from a Chukar. In one of these the bird was displaying at and being displayed back to 'in kind' by a Red-legged Partridge and I had both birds 'in my binoculars' at once. Presumably the more elaborate throat and upper breast pattern of the Redleg is relevant here.

The only calls I have heard from Chukars (feral birds in Kent) were the rally call and the 'steam engine' call and both of these sounded to my ears similar to but more husky and guttural than the 'same' calls of the Redleg (which I heard the same day).

The Rock Partridge

In appearance this bird is very similar to the Chukar, differing only in a minor point of face pattern (see sketch), in having a pure white or greyish white (not creamy) throat and more prevailing grey upper parts. The bars on its flanks look finer and a little brighter, the cream or buff band between the two black bands is narrower and the chestnut tip broader than on the corresponding feathers of most Chukars. The bill is proportionately a little smaller and, although I have not seen a live Rock Partridge, I think it might appear a little more delicate in shape.

The calls of the two are said by some authorities (e.g. Watson) to differ greatly but by others (e.g. Menzendorf, Cramp *et al*) to be similar. Not having heard Rock Partridges I will not venture a personal opinion on the matter but hope that some of our readers will have kept both and can enlighten us.

Geographically the Rock Partridge meets or overlaps with the range of the Red-legged Partridge in the south-western Alps but the two appear

ormally or always to inhabit different areas, the Rock Partridge breeding at higher elevations. Watson found evidence of similar altitudinal separation where the Rock Partridge and the Chukar appear to overlap geographically in Thrace and in eastern Bulgaria. He found no evidence of interbreeding and no hybrids or intergrades among the many specimens he collected. On the other hand Nicolai states definitely that the two hybridise in this region and treats the Chukar as a race of the Rock Partridge 'weil es (the Chukar)mit ihn (the Rock Partridge) bastardiert.' Menzdorf quotes Russian sources that claim a hybrid zone exists at some eastern fringes of *A. graeca*'s range and that captive-bred hybrids are fertile.

The Rock Partridge is found in mountainous regions from the western Alps east to Thrace and Bulgaria and south through Italy and Sicily. It mainly inhabits dry, rocky areas between tree-line and snow-line, mainly fairly open areas which include heathland, open sparse woodland, scrub and pastureland. It prefers south-facing slopes and sunny places generally. It is a permanent resident where found. In hard weather it may enter barns and other buildings in search of food (Menzdorf). It appears to have decreased and/or to be (or still be) declining over most of its range. The deterioration of the climate in the more northerly and western parts of its distribution, the decrease of old farming methods (in the Alps), and the ever increasing predation on it by sportsmen have all been suggested as possible factors. I will discuss further in this article the widespread introduction of the Chukar into parts of its range.

According to Watson the Rock Partridge is less easy to keep in captivity than is the Chukar. Two aviculturists quoted by Raethel *et al* (pp. 268 and 269) both state that the Rock Partridge is less lively (*lebhaft*) in captivity than the Chukar but one of them implies that it is equally easy to keep. Both make the point that whereas the Chukar is widely imported, sold and bred on the Continent, the Rock Partridge is rarely available from dealers. Taking a long term view I don't think the future looks over bright for the Rock Partridge although perhaps not so black as that for the Red-leg.

The Large Rock Partridge

This species has a relatively restricted range in eastern Asia, being found in parts of eastern Tibet and western Kansu. Its range appears to overlap in places with that of the Chukar (Harrison, Watson) but they are believed to be altitudinally separated with the present species normally found only above 1,500 m (Harrison).

It is slightly larger than the Chukar and the details (fine details!) of its voice pattern are closer to those of the Rock Partridge. The dark band around the pale parts of its throat and face is dark reddish brown, margined

with black along its inner edge.

Watson thinks, probably correctly, that it is most closely allied to the Rock Partridge, which must (if this is the case) formerly have had a much more extensive range. Watson suggests that the Chukar must have originated from a population of Rock Partridges which became isolated somewhere in the Himalayas or the Middle East and developed qualities that enabled it later to spread and supplant its parent form, the Rock Partridge, throughout most of the latter's former range.

In view of the obvious political, geographical and other obstacles, it seems unlikely that any readers of this article, even those living in 'the USA, so vast, so friendly and so rich' (as the poet W.H. Auden justly described their country) will have had any personal experience with *A. magna* but if any have, I hope they will inform us in the pages of our magazine.

Philby's Partridge

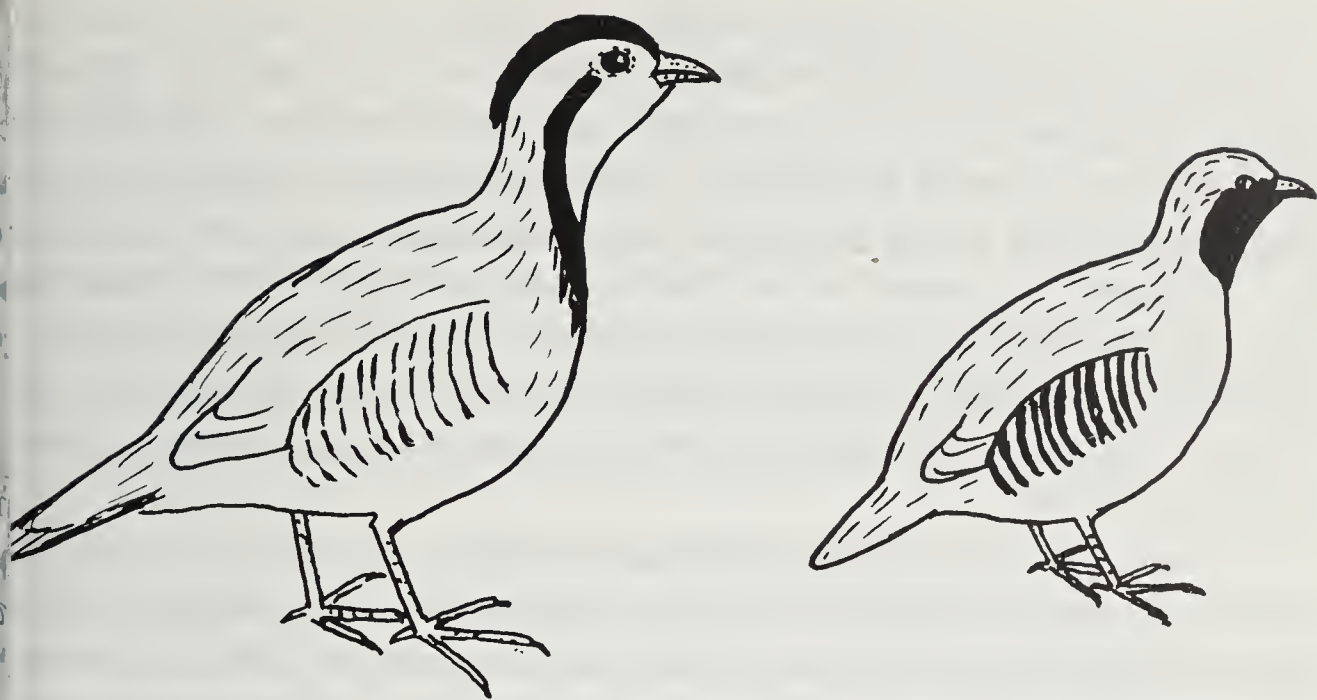
This species is very similar to the Chukar and Rock Partridges but a shade smaller and with a more tawny tinge to the greyish brown parts of its plumage. Its most striking difference is the entirely black face and throat (see sketch). It also lacks the laced pattern on the scapulars which are uniform greyish drab like the back. When the Chukar and the Rock Partridge were generally thought to be conspecific, this bird was often put as a race of *A. graeca*. However, this is not feasible (at least not in our present state of knowledge, or lack of knowledge about it). If *A. philbyi* ever came into contact with *A. graeca* or *A. chukar*, its very different facial pattern might, as in all probability it does between *A. philbyi* and the Arabian Partridge *A. melanocphala*, act as an isolating mechanism.

Philby's Partridge is found only in south-western Arabia, from Taif south to the Asir mountains. It overlaps geographically with the Arabian Partridge but is said usually to occur on more densely bushy slopes and at higher altitudes. However, much more study needs to be done on these two species in the wild (and hopefully, for details of voice and behaviour, on tame birds in aviaries). I have not read of Philby's Partridge having been imported into other countries. Perhaps it's being less beautiful than the Chukar, and less strikingly different from the latter species than is the Arabian Partridge, has been in part the reason for this.

The Arabian Partridge

This species is appreciably larger and proportionately longer-tailed than other members of the genus. The difference in size between the sexes also appears, so far as one can judge from museum skins (I have not seen the living bird), greater than in other *Alectoris*.

The top of its head is black, merging into dark reddish brown on the



the two Arabian forms. (Left) Arabian Partridge *A. malanocephala*, (right) Philby's Partridge *A. philbyi*. See text for full descriptions.

ape and both these feathers and those on the lower parts of the black surround of the white lower face and throat are elongated and probably give, at least if slightly erected, a crested and 'bearded' impression in life. There is a beautiful colour plate of the Arabian Partridge, by our late member Mr. David Reid Henry in Meinertzhagen's *Birds of Arabia*. The general coloration is a very pale brown and pale grey. The scapular feathers, and to a lesser extent many on the mantle, back and sides of the breast are pale bluish grey, bordered with pale fawn. The flank feathers are pale bluish grey banded with cream bands which are bordered by narrow black bands (see sketch). The black top to the head makes the white stripe over the eye, a striking feature of all but one of the *Alectoris* species, perhaps even more conspicuous in this bird.

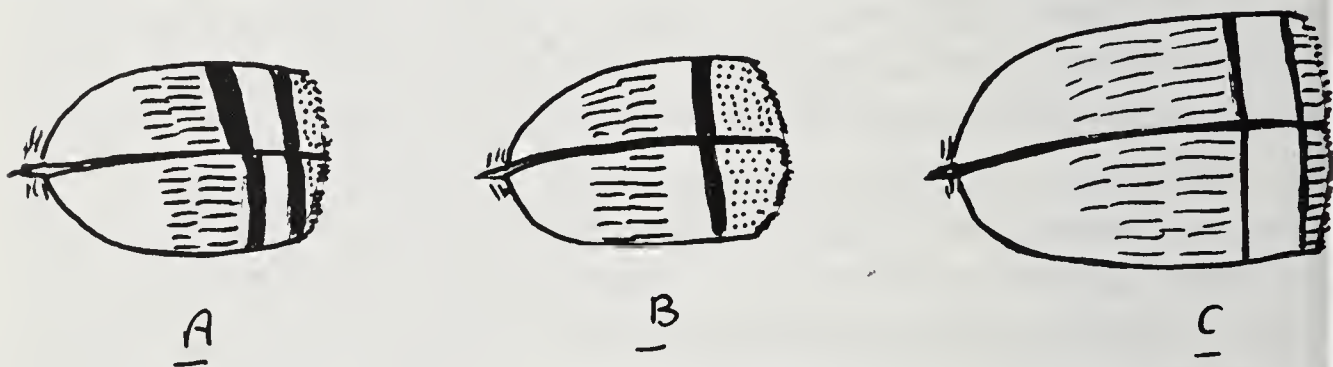
The Arabian Partridge is found, in suitable habitat, from near Mecca in western Arabia south to Aden and east to Oman. The populations in the northern and eastern Hadramaut average a little paler in colour and are usually given subspecific rank under the name *A. melanocephala guichardi*.

Like its congeners, this species frequents rocky hills, valleys (wadis) and, it is said, also upland plains. Little seems to have been recorded of its behaviour. Meinertzhagen says it is 'probably polygamous' but gives no evidence for this opinion. It was bred with some (but not very much) success in captivity in Devon in 1927 and the fact recorded in our magazine (Eth-Smith, 1928). I have seen the skin of a captive-bred hybrid between this species and the Chukar. It is a relatively dull bird, lacking the full beauty of either parent and with (surprisingly) a dull greyish throat and lower face.

The Red-legged Partridge

I consider this bird even more handsome than its congeners, with the possible exception of the very pale and pinkish desert race of the Chukar which is found in parts of Syria and Sinai. Perhaps I am biased because as a very small child I was enchanted by a description, and later an excellently coloured toy model, of the North American Robin Moth, which has rather similar rich but harmonious colour combinations, and because I later kept Red-legged Partridges myself. I described my experiences with this most beautiful and endearing bird in an earlier issue of our magazine (Goodwin, 1954).

The Redleg is a warm olive brown on the upperparts (but can bleach to a light dusty greyish brown in worn plumage) with a wine-red tinge on the neck and upper breast. The lower face and throat are pure white, encircled with black, this black surround 'running into' the lower throat and sides of neck in a kind of beautiful necklace-like effect. The lower breast is rich bluish grey, the belly deep reddish buff. The barred flank feathers are more richly coloured than, and differ from those of all other *Alectoris* in having only one black cross band. Each feather shows bright bluish grey, then a pale cream band, bordered only on the outer edge with black, then a wide terminal band of deep, bright chestnut.



Diagrammatic sketches of flank feather from: (a) Chukar *A. chukar*, (b) Red-legged Partridge *A. rufa*, and (c) Arabian Partridge *A. melanocephala*.

Key: Shaded areas black; lined areas bluish grey; stippled areas chestnut; unshaded areas cream or buff. See text for full description and specific differences in shades of these colours.

The Redleg occurs naturally in southern France, the Iberian Peninsula and a limited area of northern Italy, possibly also in Corsica, though it is just possible that it may have been introduced there as in Madeira and some of the Canary Islands. As recently as the 16th century it occurred further north, breeding in southern Germany (Nicolai). Around 200 years ago it was successfully introduced into England and is now (but see comments further on) widely if rather patchily distributed in eastern and

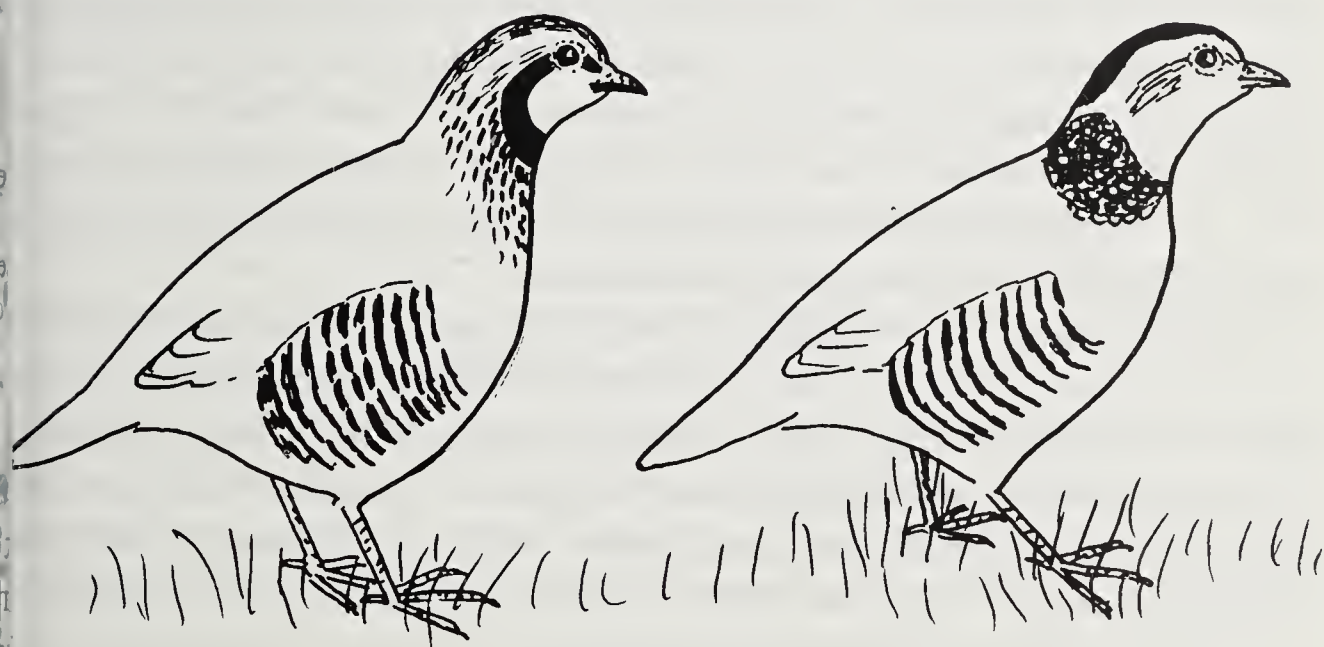
southern England. Though preferring, when available, the sort of habitats already described for its congeners, it also breeds successfully in more or less flat agricultural country although, unlike the Common Partridge, seldom in extensive fields or meadows unless these are diversified with some small hills, old quarries, raised banks, heaps of stones or gravel or similar features.

Varying numbers of geographical subspecies have been recognised by various authors, mostly on minor differences. In general, the populations from southern Iberia are darker than those from further north.

The Barbary Partridge

This species differs considerably from the others in the colour and pattern of its head and neck. A broad, chestnut brown, blackish-edged stripe runs along the top of its head from the base of the bill to the hind neck. The broad stripe over the eyes, the lower face and the throat are light grey, and there is a large patch of dark or light (according to race) chestnut, spotted with white, on each side of the neck. The flank barring is very like that of the Chukar and Rock Partridges.

The rather elongated head feathers and the head pattern both suggest that this form may be more closely related to the Arabian Partridge than it is to the other species.



Diagrammatic sketches of (left) Red-legged Partridge *A. rufa*, and (right) Barbary Partridge *A. barbara*, to show face and neck patterns.

There are photographs, and delightful sketches illustrating its displays and some other postures, in the paper on its behaviour by de Reyna and Alvarez, and there are good colour drawings in Jonsson.

The Barbary Partridge is found from north-western Africa east to coastal eastern Libya (see Harrison for distribution map) and has been introduced to some of the Canary Islands, Gibraltar, and probably also to Sardinia and to Porto Santo.

Some comments on the Chukar in Britain and Europe

People and organisations concerned with bird conservation in Britain appear to regard gamebirds (pheasants, partridges and grouse) as outside their field of interest. There are good, or at any rate expedient reasons for this, which I do not propose to discuss here. Not surprisingly perhaps, most 'rank and file' birdwatchers have taken the cue from 'their betters' and subscribe to the view that these beautiful creatures are not, *and should not be*, of any concern except to those who enjoy killing them.

Hence, although those in authority in such matters are now generally 'dead against' the introduction of any foreign species of bird or beast (to such an extent that a most eminent person has felt it necessary to write apologetically because he has enriched our avifauna and our lives by introducing a harmless and beautiful bird) no hint of criticism has been voiced against the extensive introduction of the Chukar. It, of course, was not introduced for aesthetic, sentimental or other such despicable reasons but for the improvement of 'legitimate sport', a most commendable aim in the view of our masters.

Both Chukars and Chukar x Redleg hybrids are said to have been widely introduced but all the references I have seen have given little or no detailed information. One writer (Lever, 1977) states that the Chukar is established on part of the South Downs and that the Rock Partridge is established in Scotland. This latter I find hard to believe and wonder (in view of Continental statements about the rarity of the Rock Partridge in trade) if there has not been misidentification.

My own personal knowledge of the Chukar here has been mainly of the species in a part of Kent. Here both I and others have seen numbers in the past three years. A birdwatcher friend of mine, not knowing of the Chukar's introduction, had not separated the species from the Redleg and was astonished, after I had told him how to do so, at finding it the more abundant of the two in some (but not most) parts of the places he visits.

I saw two pairs of Chukars in the spring of 1984 and no Redlegs (in the limited area I covered) although there were apparently pure Redlegs there in the following autumn. This spring, on 5th March (1985), I saw mutual threat display and other interactions that gave me the impression that the

birds were regarding each other as conspecifics. This appeared to be confirmed on a later visit, on 2nd May, when I saw in all four pairs of *Alectoris*, two of which were two Redlegs, and the other two pairs each of a Chukar paired to a Redleg.

About eight years ago an ornithologist who then lived in Andorra told me that there, and in adjacent parts of northern Spain, the long-continued releasing of Chukars by the sporting fraternity had resulted in extensive interbreeding and (my informant was a bird artist) he found it impossible to obtain phenotypically pure Redlegs locally for his illustrative work.

As early as the 1950s I was told that Chukars and Chukar x Redleg hybrids had been widely introduced in southern France.

Thus it looks as if the Redleg may well be threatened in Britain *and* in its native haunts as well. Since the Chukar will *either* interbreed with or compete with it. On present, but so far very scanty, evidence, it seems that interbreeding is more likely.

I am not one of those who are against all introductions and if we did not have the Redleg here already, I would have no objections to the introduction of the Chukar. As it is, however, the Redleg having so much smaller world range and being already fairly well established here, I do not think it was justifiable to introduce the Chukar, and deliberately to introduce it into precisely those areas where the Redleg was established and moderately common.

It appears (Menzdorf, Nicolai) that the Chukar has also been widely introduced into the native range of the Rock Partridge. It is perhaps even more likely to interbreed with or supplant this species, though from an aesthetic point of view the loss would be less, as the Rock and Chukar partridges are so similar in appearance whereas the Redleg differs in many features. However, the sportsmen will do what they want and if they finally decide that the Chukar really is a 'better sporting bird', the Rock partridge and the Redleg, and perhaps later the Barbary, Philby's, Arabian and Large Rock Partridges, will be deliberately replaced by it.

It is to be hoped, but not expected, that some aviculturists will be able to conserve pure stocks of the other *Alectoris* species if and when this happens, or rather in anticipation *before* it does.

I would, incidentally, be most grateful if any knowledgeable reader can give us a description of the Chukar x Redleg hybrids. All I have seen in the wild have appeared 'pure' Redleg or pure Chukar 'in the binoculars' but I have not, of course, been able to examine them critically in the hand.

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THE SISKINS OF SOUTHERN AFRICA

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The Cape Siskin *Serinus totta* is also known as the Totta Siskin, Siskin Canary and Rock Canary. It is a shy and unobtrusive species and usually occurs in pairs or small groups of up to 15 birds.

The canary-like song is soft and pleasant with a similar flight call to that of the Yellow-eyed Canary *Serinus mozambicus*. The male has the crown and nape light brown streaked darker brown; mantle, scapulars and wing-coverts slightly russet earth-brown; rump olivaceous yellow; sides of face and ear-coverts yellowish brown; underparts dull olivaceous yellow; white tips to wing and tail feathers diagnostic for both sexes; eye brown; bill brownish, paler below; legs and feet pale brown. The female differs from the male in having the underparts lime green; throat and breast olivaceous yellow, throat streaked brown. Juveniles have the chin to chest and upper flanks streaked with dusky.

This siskin is found in the western Cape Province of South Africa in the northern Cedarberg to the Great Kei River. It lives in bushes and scrub in mountainous regions, in exotic pine plantations and sometimes occurs along the coast.

The diet includes graminoid seed, archenes, foliage buds, fresh floral parts, nectar and animal matter. A summary of food genera recorded in the diet of this species: *Urticaceae* (nettle family); *Chenopodium* = *Chenopodiaceae* - the ganna, salt bush and goosefoot family); *Ficinia* = *Cyperaceae* - sedge family); *Leucadendron*, *Protea* (*Proteaceae* - protea family); *Restio*, *Thamnochortus* (= *Restionaceae* - the reed family); animal matter was unidentified (Milewski, 1978). Barnicoat (1983) reports that in captivity it will take a seed diet supplemented by green food; egg food and soaked seed is suitable for rearing with a daily supply of spinach beet, endive, chickweed and seeding grass heads, and it is extremely partial to tiger seed. Aviary observations have revealed the taking of termite alates during nesting, also Khaki weed *Alternanthera pungens*, Canary creeper *Tenecio tamoides* and Pepperweed *Lepidium africanum*.

During nesting three to five plain white eggs are laid in a shallow cup which is fairly well-built of fine dry grass and rootlets, lined with finer grass, maidenhair fern, wool or some hair. The furry down of protea has also been recorded as a nest lining. The nest, the cup of which has a diameter of 5.1 cm and a depth of 2 cm, is placed on a rock ledge, or in a hollow rock, often concealed by low shrubs growing out of the cliff face.

*Neville Brickell*

Male Cape Siskin

Steyn and Myburgh (1980) record a nest in the hole in the trunk of a large tree at 3.6 m from the ground. In captivity it prefers to utilise a nest-box and may use dried lettuce, watercress and chickweed as nesting materials and coir or seedheads as lining. The nest building is carried out by the female with the male accompanying her on collecting trips. Only the female incubates, for 16-17 days, with the male feeding her at the nest. Both adults remove faeces from the nest during the whole nestling period. The young leave the nest at 20-24 days, and are fed by both parents by regurgitation.

When they leave the nest, immature birds can be sexed with a fair degree of certainty as males are more yellowish on the throat and breast. Adult plumage is acquired some three months later. One parasite egg which was found to be infertile, belonged to the Red-chested Cuckoo.

Cuculus solitarius. It has been suggested that the cuckoo may have mistaken its host's nest as being that of the Dusky Flycatcher *Muscicapa adusta*.

Hybrids between this species and a male Oriental Greenfinch *Carduelis sinica*, Cape Canary *Serinus canicollis* and Black-throated Canary *Serinus atrogularis* have been recorded.

The Drakenberg Siskin *Serinus totta symonsi*, or, to give it its alternative names, Mountain Siskin or Brown Canary, is a less attractive subspecies that differs from the typical *totta* mainly in respect of its basic colouring. Males lack the white-tipped secondary and tail feathers of the Cape Siskin. The female is duller and browner below by comparison with *S.t. totta*. It occurs in western Natal, Orange Free State and north-eastern Cape, provinces of South Africa, Transkei and the mountains of Lesotho. Little is known of its feeding habits in the wild except that seeds, buds, insects and the soft bases of *Erythrina* flowers form the diet. In captivity the birds will accept the same basic diet as *S.t. totta* with the addition of Black-jack *Bidens pilosa*, Bird grass *Poa trivialis*, Small Canary grass *Phalaris minor* and the buds of Smeltersbossie *Flaveria bidentis*. Egg colouring differs from *totta* being white to pale greenish blue, sparingly spotted with grey and brown mainly at the large end. The incubation and nestling periods for the wild and in captivity are unrecorded.

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TAKING CARE OF A VISUALLY IMPAIRED BLACKBIRD

Turdus merula

By Dr. M.A. SCHLEE

(Museum of Natural History, Paris, France)

A male Blackbird was found as a fledgling in the French department of Hauts-de-Seine in June 1975, hand-reared and named 'Koko'. The bird was given to me when he was about 45 days old, and was then used in a study on the development of prey-attack behaviour in Blackbirds (Schlee, 1983). From the second year on, Koko was free-ranging in the Insectary greenhouse (7.5 x 3.5 x 3.5 m) which he claimed as his territory; he also made frequent excursions into the adjoining rooms of the Insectary in search of insects and spiders. At the age of seven years, Koko had a traumatic experience which terminated in total blindness. This paper will recount how he was able to adapt to his infirmity and be successfully maintained in his usual environment for several months before being caught by a stray cat on 10th October 1982.

Events leading to blindness

Blackbirds are known to be highly territorial and aggressive (Snow, 1958; Hambly, 1966), but until the end of December 1981, the garden birds had never engaged my Blackbirds in territorial combat. At that time, however, a juvenile male had just established himself in the garden surrounding the Insectary. The two birds fought nearly every day, pecking at each other across the glass panels and roof of the greenhouse. In doing so, Koko was apparently rubbing and hitting his eyes against the glass, the impact of which was sufficient to provoke the formation of a cataract in each eye.

During the last week in February 1982, Koko's flight and feeding behaviour had become noticeably abnormal. After a violent fight on 3rd March, Koko showed signs of cerebral trauma and received veterinary attention; I then learned that a cataract had formed in the right eye which had been so damaged that it was no longer functional. By 22nd March a cataract had formed in the left eye, but some peripheral vision still remained: Koko was able to visually follow side-to-side hand movements executed at a maximum distance of 0.72 m, but only in the lower half of the frontal visual field. Since the left eye was still functional, visual capabilities were able to be increased by applying eye-drops for dilating the pupil. It is difficult to say when Koko lost all sight, for there were no major changes in behaviour. A routine check of the peripheral visual field

carried out during August revealed that Koko was completely blind at that time.

Phase 1: Loss of sight in right eye

Some of Koko's abnormal behaviour patterns were probably due both to brain damage and to the progressive formation of a cataract in the left eye. During this period, Koko was highly unco-ordinated and often went through bouts of stereotyped pecking movements directed into the bowl of commercial feed, but none of the food was touched. Other abnormal behaviour, such as flying in a circle around a point before trying to land or walking into obstacles, was also noted. In addition, there was a clear lack of accuracy in seizing insects regardless of their mobility, and Koko always gave several initial pecks to either side into the void. The typical, alternated monocular fixation movements were retained, but as soon as the insect came into the visual field of the right eye, Koko either walked on it or left. There was also a sharp drop in foraging behaviour: Koko spent most of the day perched in the same place with his good eye directed toward the entrance; he no longer went into the Insectary in search of insects, nor did he dig in the compost pile on the far side of the greenhouse. In fact, his movements were restricted to about one-fourth of the space available. During this time Koko seldom sang and seemed tired and restless. He also started becoming highly fearful and aggressive; when approached, he backed up a few steps and then launched a defensive attack.

Phase 2: Peripheral vision in left eye

The first striking change in behaviour was the abrupt loss of all activity, including feeding. Koko spent four days at a veterinary clinic where an energetic treatment was undertaken to try to favour the resorption of the cataract. During his stay, he succeeded in locating half a hard-boiled egg and half an apple placed in his cage, but no attempts were made to eat either insects or commercial feed. Since Koko did not eat enough to maintain correct body weight, I force-fed him with meat, insects, a vitamin supplement and Glucidic Trophysan (Laboratory EGIC, Montarville, France). The latter substance, containing all necessary amino acids, had to be diluted in order to avoid the bird choking on it. Whenever I manipulated Koko, he would suddenly go limp and play dead (head falling forward, eyes closed); but as soon as I released my grip, he attacked my hand or retreated. Since the tail feathers were fanned and depressed in a typical threatening posture, Koko generally walked on them and had difficulty maintaining his balance while backing up; at that point he always attacked. The same behaviour was shown when

Koko was entirely blind.

When Koko was brought back to the greenhouse, he was placed in a small cage (0.58 x 0.26 x 0.37 m) equipped with a median horizontal perch and a diagonal one extending from it. The cage was installed next to the usual feeding site. Koko was caged for safety reasons: the sudden loss of sight provoked uncontrolled, unoriented escape behaviour and general signs of panic. Koko acted as if the sudden darkness was due to external factors which could be overcome through escape manoeuvres. It is interesting to note that the same type of behaviour was always elicited when Koko was enclosed in a box for transportation purposes; there was a very close correlation between the waning of this behaviour and the resumption of self-feeding.

The first step was to teach Koko to locate food in his cage. Half a hard-boiled egg and half an apple were always available and were placed in the same spot; these items were quickly discovered. But prey items (mealworms, crickets and cockroaches) had to be small enough to be able to be swallowed with a minimum of handling. To make it easier for Koko to find them, I used a small pottery bowl that had an opening of 4 cm and a depth of 2 cm and attracted Koko's attention by tapping on it with my finger. Since Koko always vigorously pecked at my hand, it was quite easy to deflect his pecking movements to the dish of insects. If Koko dropped an insect on the ground, he relocated it by tilting his head in such a way as to use his peripheral visual field; but even so, he could only determine the approximate direction and always gave several haphazard pecks before finding the insect. I was also able to train Koko to take mealworms directly from my hand: I had to hold the insect in such a way that a forward pecking movement would immediately establish contact with it, and I always first called Koko by name.

By 29th March 1982 Koko's general behaviour and his weight were returning to normal and I started letting him out of his cage for a few hours every day. At that time he occasionally bathed, sang, flew to the opposite side of the greenhouse and even sunbathed under the rafters. From 7th April on, Koko was once again free-ranging in the greenhouse. The next step was to teach Koko to locate food placed at his usual feeding site. Two half apples impaled on wooden spikes and half a hard-boiled egg were lined up next to each other; Koko had no apparent difficulty locating them. The small pottery bowl was also aligned and firmly fastened into the ground; I attracted Koko's attention by tapping on the bowl. At this signal Koko always rushed to the dish site, tapped from side to side with his beak until he located the bowl, then tapped the rim before pecking into it. By 13th April Koko no longer tried to fixate the insects by cocking his head from side to side. However, it

took until 16th May for Koko to learn how to eat his usual commercial feed (Sluis' feed for insectivorous birds) and this seemed to have been facilitated by changing the type of dish.

Before Koko became visually impaired, he always ate from a heavy glass receptacle (11 cm diam., 4.4 cm deep) by perching on the rim and then leaning forward to seize the feed. After losing his eyesight, Koko continued this behaviour but with one basic difference: the distance that he leaned forward was fixed and was insufficient to allow him to touch the feed even if the dish was full; apparently he never tried to eat from a standing position. I finally found a dish that allowed Koko to touch the bottom when leaning forward from a standing position. (In this case he never tried to perch on the rim.) The receptacle was oval in shape (12.4 x 5 cm), had a total height of 4 cm, but because of its raised bottom, was only 2.7 cm deep. Within one week Koko had perfected his feeding techniques, but he always remained incapable of seizing the morsels - his beak was used as a shovel and whatever feed entered it was swallowed.

Spatial orientation was probably facilitated by the layout of the greenhouse: along the front (divided into two equal parts by the entrance and a cement passage leading to the back rooms) and along the sides, there is a built-in, cement shelf, 96 cm wide, located at about 74 cm from the ground. This structure is filled with dirt and contains tropical plants. Nearly all of Koko's manoeuvres took place on this platform in an L-shaped area approximately 2.86 m across the front and 1.76 m along the side, which included the usual feeding and bathing sites. Koko's itineraries followed the walls of the greenhouse and the ledge of the platform, and included several cross routes and precise stopping points. When Koko accidentally stepped over the ledge, he generally flew back to his starting point; however, if he landed on the ground, he often retreated into a corner and I was obliged to recover him. Koko also used the space between the platform and the roof and had several precise perching sites: the main one was an overhanging branch located about 2 m from the ground and about 57 cm from the ledge. In order to orient himself, Koko darted from one side of his feeding site to the other, touching the plants and the flower pots, toward the back where he came into contact with a small wooden footstool, then out to the edge of the platform. Flight-intention movements were shown at each stopping point. When the direction of the branch seemed to be located, Koko flew forward; if he missed it, he immediately returned to the platform and repeated the orientation movements.

Phase 3: Total loss of sight

Blindness did not modify the behaviour that had developed during the period of peripheral vision in only one eye; however, Koko's level of activity always remained low. Body weight was maintained throughout this period, and moulting was carried out correctly. In order to get Koko to eat insects, I continued to put them in the small pottery bowl or to give them to him direct. In the latter instance, I always called Koko by name and continued talking to him while quietly approaching; any sudden noise provoked intense panic. I then gently touched the tip of his beak with the insect and held it in front of him; Koko only pecked straight ahead even if he missed the insect. During this phase Koko never dropped a prey item on the ground. All insects were slightly mandibulated and, if necessary, re-oriented in the beak for swallowing. When locating the drinking bowl, Koko stopped at a short distance from it and tapped with his beak; as soon as he struck the rim, he slipped his beak along the inner side until he touched the water.

Orientation from the ground improved with time: when Koko was in the middle of his half of the greenhouse, he gave many flight-intention movements in the direction of the platform while running back and forth between the steps near the entrance and his starting point. In this way he was apparently able to determine his position, and when he finally flew up, he landed on or near the wooden footstool behind the bathing receptacle; nonetheless, his occasional excursions to other parts of the greenhouse were not so well-oriented.

Koko spent a lot of time at one of the screen windows where he could 'survey' the garden, as he did every year before becoming blind. Inside the greenhouse a piece of glass had been leaned against the screen, leaving a space of about 15 cm. Koko was well-acquainted with the route leading to and from the window. At that time I did not realise the potential danger of such a set-up. A stray cat must have noticed that Koko did not react to its presence and took advantage of the situation by tearing off part of the screen. No feathers were found near the window, so I assume that Koko played dead as he usually did when I picked him up. The first trace of contour feathers was found at more than 15 m from the greenhouse. Koko had managed to escape from the cat and was found several metres further away, but he was too seriously injured to survive. Judging from the cut marks around the beak, Koko must have become panic-stricken (probably by the sound of the screen being ripped off), and, instead of leaving the window by his usual route, must have persistently jumped against the screen (1 cm wire mesh).

Conclusions

The only effective way of stopping the fights with the garden Blackbird would have been to cut off visual contact. Wire netting on the outside of the greenhouse was not sufficient, for the captive bird continued tapping against the glass during its attacks and, therefore, considerable portions of the glass panels were whitewashed. In a similar situation, it is vital that these measures are taken at the first sign of agonistic behaviour. The corners under the rafters are particularly dangerous if there is a support on which the captive bird can perch, for from this position the bird can rub its eyes against the glass when turning in circles trying to peck at the feet of its adversary.

When I first released Koko in the greenhouse during phase two, I thought there would be no more problems with the garden male since Koko could not see him. However, as soon as the young male landed on a narrow ledge located at the level of the cement platform, Koko rushed to the spot and resumed fighting. Auditory cues probably alerted him to the presence of his rival, for the young male gave the strangled song while aggressively displaying. These panels were also whitewashed and, in addition, a wire grating was placed on the outside in such a way as to prevent the young male from landing on or near the ledge. The garden male also fought with the six-year-old, hand-reared male whose breeding success in captivity was previously reported in this magazine (Schlee, 1981 and 1982). Their fights also took place across the glass panels of the greenhouse which, in turn, had to be whitewashed. In addition, these two birds fought at the screen window and across the netting of the aviary when the roof of the greenhouse was open; but the garden bird never fought with the adult male offspring of the established nesting pair although they were housed in adjacent aviaries.

Several points concerning the care of a blind bird should be emphasised. First, the bird should be left in its usual environmental setting and all objects should be maintained in their respective positions. This allows the bird to use locational information that was acquired before going blind. In the case of Koko, general topographical orientation was probably aided by the presence in the greenhouse of a number of smaller avian species whose behaviour could have provided additional locational information. Secondly, it is rather difficult to get the bird to eat correctly once the initial traumatic reaction has been overcome. Although apples and hard-boiled eggs seem to be easy to discover during haphazard movements, special steps must be taken to train the blind bird to locate dishes of food and to associate the receptacle with a particular food item. Koko was easy to train since he already had the habit of attacking my hand; his attacks could, therefore, be directed toward a dish in which he could discover

something to eat. Once this discovery has been made, the bird can be trained to approach at a given signal (e.g. tapping the container). The size and the shape of the feeding dish are also very important. Thirdly, long distance orientation improves with time and partly depends on auditory cues. Koko was finally able to move about in a little less than half of the greenhouse and quite visibly listened to sounds coming from the open windows, the door, the sink, etc. All major routes were quite stereotyped, and Koko was able to go rapidly to his feeding site from any point in his restricted territory. However, objects at close range were always located and identified by systematic tapping with the beak.

Koko's successful re-adaptation clearly shows that the Blackbird is capable of topographically orienting itself by using sensory modalities other than vision and of forming a cognitive map of its spatial environment.

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THE BIRDS OF CHENGDU ZOO PEOPLE'S REPUBLIC OF CHINA

By JEFFERY BOSWALL
(Bristol)

On 25th September and again on 8th October 1985, I was escorted round the zoo in Chengdu, the capital of Sichuan province in China. The zoo is in the suburbs of the city (of 1.4 million people, with another seven million around). It moved there from a downtown site in 1976. At its earlier location, the zoo dated back however, only to 1953. I was twice shown round by the assistant director Madame Song Yunfang, and met the director Mr. He Guangzin. The total zoo staff is 260 persons. On the second visit I was accompanied also by Zheng Junfan, an ornithologist from the Biology Department of Sichuan University. Apparently the zoo receives two million visitors a year, each one paying 20 feng, i.e. about 7 U.S. cents.

I was told there were about 100 species of birds kept at the zoo. The following is my attempt to outline the establishment's bird population, with special attention to the pheasant and crane families.

No less than six species of crane were present. There were four Sudan Crowned Cranes *Balearica pavonina* from Africa, and five east Asiatic species. These were: six White-naped Cranes *Grus vipio*, four Hooded Cranes *G. monacha*, three Demoiselles *Anthropoides virgo*, five Red-crowned Cranes *Grus japonensis*, and four Common Cranes *G. grus*. The zoo had sent its two Black-necked Cranes *G. nigricollis* elsewhere; one to Beijing zoo, the other to the zoo at Sining (the capital of Tsinghai province).

I specially asked about Phasianids and was told that the following species were present at the zoo; most of them I saw myself:

Chukar Partridge	<i>Alectoris chukar</i>
Chinese Francolin	<i>Francolinus pintadeanus</i>
Common Hill Partridge	<i>Arborophila torqueola</i>
Chinese Bamboo Partridge	<i>Bambusicola thoracica</i>
Temminck's Tragopan	<i>Tragopan temminckii</i>
Chinese Tragopan	<i>T. caboti</i>
Chinese Monal	<i>Lophophorus lhuysii</i>
Silver Pheasant	<i>Lophura nycthemera</i>
Red Jungle Fowl	<i>Gallus gallus</i>
White Eared Pheasant	<i>Crossoptilon crossoptilon</i>

Blue Eared Pheasant	<i>C. auritum</i>
Brown Eared Pheasant	<i>C. mantchuricum</i>
Reeve's Pheasant	<i>Syrmaticus reevesii</i>
Elliot's Pheasant	<i>S. ellioti</i>
Common Pheasant	<i>Phasianus colchicus</i>
Golden Pheasant	<i>Chrysolophus pictus</i>
Lady Amherst's Pheasant	<i>C. amherstiae</i>
Blue Peafowl	<i>Pavo cristatus</i>

There were only a few individuals of each species.

On or by the zoo's large lake were two Mute Swans *Cygnus olor*, and 21 adult Whooper Swans *C. cygnus*, plus seven young Whoopers hatched earlier in the year at the zoo. There were half a dozen Eastern Greylags *Anser anser rubrirostris*, two White-fronted Geese *A. albifrons*, six Swan Geese *A. cygnoides*, one Bar-headed Goose *A. indicus*, two Shelducks *Tadorna tadorna* and one Ruddy Shelduck *T. ferruginea*, a dozen Mandarins *Aix galericulata*, a few Mallards *Anas platyrhynchos*, a few Wigeon *A. penelope*, a Pochard *Aythya ferina* and at least one presumed Scaup *A. marila*. There was one Coot *fulica atra* and three Black-tailed Gulls *Larus crassirostris*. Two Oriental White Storks, birds of an eastern form held by some to be a separate species, *Ciconia boyciana*, were a pleasure to behold. An albino Cormorant *Phalacrocorax carbo* was preening itself alongside three Dalmatian Pelicans *Pelecanus crispus*.

In a large cage for water and waterside birds were three Black Swans *Cygnus atratus*, four Spoonbills (sadly *Platalea alba* and not *minor*, the scarce Black-faced species), three Sacred Ibises *Threskiornis aethiopica* no doubt of the local race *melanocephalus*, three Little Egrets *Egretta garzetta*, a Black-crowned Night Heron *Nycticorax nycticorax* and four Black Storks *Ciconia nigra*. There were also six Black-headed Gulls *Larus ridibundus*.

A flight cage for raptors housed a Golden Eagle *Aquila chrysaetos*, a Pallas's Fish Eagle *Haliaeetus leucoryphus*, a Lammergeyer *Gypaetus barbatus*, two Black Vultures *Aegypius monachus* and five Himalayan Griffons *Gyps himalayensis*. Nearby were two large owls; I suspect they were Eagle Owl *Bubo bubo* and Tawny Fish Owl *Ketupa flavipes* but am not sure.

We come now to the more terrestrial and arboreal species. Exotic parrots included one Rainbow Lory *Trichoglossus haematodus*, four Greater Sulphur-crested Cockatoos *Cacatua galerita* and two Lessers of the Citron-crested race *C. sulphurea citrinocristata*, a hundred Budgerigars *Melopsittacus undulatus*, four Cockatiels *Nymphicus hollandicus*, two

species of *Amazona* (one of each), and four Fischer's Lovebirds *Agapornis fischeri*, and two species of macaw, the Blue and Gold *Ara ararauna* and (probably) the Military *A. militaris*. There were two Lord Derby's Parakeets *Psittacula derbiana*. This species is indigenous to Sichuan and China. Two ratites were the Emu *Dromaius novaehollandiae* and the Ostrich *Struthio camelus*.

Indigenous Chinese passerines on display included one Grey or Himalayan Tree Pie *Dendrocitta formosae* (a beautiful bird), two White-throated and four Greater Necklaced Laughingthrushes *Garrulax albogularis* and *G. pectoralis*, one Oriental Greenfinch *Carduelis sinica*, one White-rumped Munia *Lonchura striata*, four Black-headed Hawfinches *Coccothraustes nigratorius* and two 'straight' Hawfinches *C. coccothraustes* - half-a-dozen Pekin Robins *Leiothrix lutea*, and 50-100 *Zosterops*, some at least being Chestnut-flanked Whiteeyes *Z. erythropleura*. There was a Rook *Corvus rugilegus*, a Magpie *Pica pica*, three Red-billed Blue Magpies *Urocissa erythrorhyncha*, ten White-cheeked Starlings *Sturnus cineraceus*, and one Crested Mynah *Acridotheres fuscus javanicus*. Thrushes included one Magpie Robin *Copsychus saularis*, one Dusky Thrush *Turdus naumanni* and one (apparently) Eye-browed Thrush *T. obscurus*.

I enquired about the three Sichuan endemics, the Szechwan Hill Partidge *Arborophila rufipectus*, the Omei Shan Liocichla *Leiocichla omeiensis* and the Crested Parrotbill *Paradoxornis zappeyi*, but none was held in the zoo.

The last bird I'll mention is the local Quail *Coturnix coturnix japonica*. There were two or three at the zoo. This species had been domesticated in China. I visited one Quail 'farm' where there were 80,000 birds, five females to every two males. The males are used for breeding and sold for meat. The females produce about 300 eggs in their first year and are then killed for meat. The farm's output was 30,000 eggs a day or well over ten million eggs a year. But the domestication of birds is another story, as is the current role of wild birds-of-prey in Chinese traditional medicine.

Some of their avian stock the zoo no doubt get from the wild-bird markets of the city and smaller outlying towns, several of which I visited.

To sum up. There were at least 86 different bird species in Chengdu zoo in September-October 1985. I probably missed another 10%. Of these 86, 82 were positively identified; and of *these* no less than 28 (33%) are on the list of wild birds for Chengdu and its environs (Zhang Junfan, 1985) and 60 (71%) are on the list for the province of Sichuan (Shi Bainan and Zhao Ermi, 1982). By comparison with many western zoos this must surely be a high percentage of 'locals'?

As a tailpiece let me mention the Turkey *Meleagris gallopavo*. Its

picture appears in the zoo guide and until early November 1983 there were four birds. Two of these I am reliably told by a local American succumbed to Thanksgiving! In 1985 I could find not two but none; but, of course, there had been another giving of thanks in November 1984!

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NEWS FROM LEEDS CASTLE

(Maidstone, Kent)

By DAVID D. FRANK

(Curator)

The late Hon. Lady Olive Baillie, who was a member of the Avicultural Society, established world-famous aviaries at Leeds Castle some 30 years ago and her enthusiasm brought many rare and varied species to the Castle, and in particular she loved the Rosellas and Ring-necked Parrakeets. Since her death the collection has been maintained and still includes many interesting colour mutations.

The Leeds Castle Foundation, a registered charity, is now constructing a modern and very extensive facility, next to the Culpeper Garden, to be ready later this year, which we hope will establish Leeds Castle as the home of one of the outstanding collections in this country and give as much pleasure to our visitors as it did to Lady Baillie.

The aviaries are being built of stainless steel frames which will be enclosed by removable panels of wire that will have no edges showing. The frames are quite an architectural masterpiece with a Victorian style roof.

Each aviary will have a small pool of water in the front that can be drained from the outside and will blend in well with the natural perches and nest-boxes. The strings of rectangular aviaries between the hexagonal flights will have slanted concrete floors with a drain at the back and will

be covered with rock and gravel. This will allow cleaning to be done from the outside and provide proper drainage in inclement weather. Each flight will also have an area at the rear that will serve as winter quarters, should the birds require additional shelter. We feel that the design will be clean and easy to maintain and should offer all the security necessary for breeding as well as providing an attractive exhibition for the public.

A modern hospital, incubator room (with back-up power source), proper food stores and kitchen are attached to the main block of flights. The kitchen will be on public display so that food preparation and hand-feeding may be observed.

We are designing educational tours for school groups and special interest groups that will be centred around behind-the-scenes activities.

The centrepiece of the Lady Baillie Memorial Aviary will be the Australian species that Lady Baillie was so fond of, but it will also include many other types of birds, including macaws, Amazon parrots, cockatoos and many softbills, as well as finches.

We have had much valued advice from the avicultural world, and in particular Raymond Sawyer, Rosemary Low and Dr. James Dolan (General Curator for the San Diego Zoo). Everyone at Leeds Castle including Peter Taylor, who has taken care of the birds at Leeds Castle for the last 30 years, staff and the architects and engineers are very excited about this project and are looking forward to its completion. We would like to invite members of the Avicultural Society to visit us and hope that this can be arranged in the spring of 1987.

* * *

NEWS FROM BIRDWORLD

(Farnham, Surrey)

By ROBERT HARVEY

Having searched unsuccessfully for a mate for our single male Hyacinthine Macaw, in the spring of 1984 Bristol Zoo kindly offered to lend us two females to see which took his fancy. When the weather grew warmer, I introduced the new females but for 10 weeks our efforts looked in vain for he took no notice of either female. We decided to send one female back to Bristol Zoo, leaving us with a pair.

During that summer the pair sometimes sat next to each other but no signs of breeding were seen. I was not too worried about this as it was their first year together. Several other macaws were successfully bred, some of them hand-reared. By the autumn we thought all breeding had finished. The day arrived when all the birds were to be dusted with Cooper's Louse Powder to keep at bay any parasites picked up during the summer and by midday the Hyacinthine Macaws had been reached. Both were dusted and then I looked quickly (because these two were never the friendliest of creatures) into the nest-box and to my amazement a two-week old chick was sitting there! It was decided that, because we had disturbed the parents and as the chick did not look too healthy, we would hand-rear it. We managed to rear 'Golly' and also 'George' in 1985; now we have high hopes for another success in 1986.

This was only made possible by co-operation between our zoos and I would like to thank Geoffrey Greed, Director of Bristol Zoo, for the loan of the Hyacinthine Macaw hen.

We have also had an example of co-operation between our birds here. Five years ago we had four breeding pairs of Quaker Parrakeets in a flight about 12 x 20 x 10 ft (3.66 x 6.10 x 3.05 m). One night a hole appeared in the roof and one of the pairs was missing.

Traps were put out immediately but the parrakeets took no notice mainly because our macaws are kept on barrels outside so the parrakeets just stole their food.

Later on that year, after pruning a few twigs off the many trees in the park, a nest 6 ft (1.83 m) in diameter appeared at the top of a pine tree. Not only did the Quaker Parrakeets nest here, but squirrels, starlings, sparrows and Bluetits also. Unfortunately this wildlife commune came to a sad end because the weight of the nest after a storm pulled the tree over to a 45° angle and we had to take it all away for safety reasons.

After that winter I was looking for some good nesting platforms for my



Kathleen Harvey

Quaker Parrakeet incessantly expanding the nest site
Original nest-box on the top left of the photograph

spoonbills when I had an idea. I put all the remaining Quaker Parrakeets, plus great quantities of hawthorn twigs into the large spoonbill aviary. My luck was in for that year the parrakeets built four massive nests and bred prolifically. As hoped, these nests made perfect platforms for the spoonbills and the two pairs produced four young between them.

As the entrance hole of the parrakeets is always under the mass of twigs, the two very different birds did not squabble at all!

The most popular aviary at Birdworld must be the Seashore Walk. This aviary is about 60 x 120 x 20 ft (18.28 x 36.57 x 6.10 m) and in it is a wave machine which was specially built for us and works by displacement of water with a wooden wedge, driven by an electric motor. This produces a wave about every three seconds. There are many tons of rocks and sand to produce the effect of a beach with an old rotten boat to add the finishing touch. The birds housed here are Shags, Oyster-catchers, Inca Terns, Curlew, Tufted Duck, Goldeneye, Spur-winged Plovers, Eider Duck and, of course, gulls.

Our visitors seem to be mesmerised by the waves. We once made a survey at the exit of the Seashore Walk, asking people what birds they had seen. Most of them could not remember two birds! The public are seen just gazing into the moving water. Last year the Shags, plovers, all of the ducks and gulls laid eggs so perhaps the waves help to make an environment as close as possible to their natural surroundings which is what every aviculturist wants to achieve.

* * *

RECORDS OF RATITES BRED IN CAPTIVITY IN THE BRITISH ISLES

By DAVID COLES
(Ascot, Berkshire)

Members of this group of large flightless birds have always been popular exhibits in both public and the larger private collections and have long been kept. As with my previous records covering Waterfowl (*Avicultural Magazine*, 1983, Vol. 89, p. 218), each entry constitutes the earliest reference that I could trace. If any member is able to correct a record, please contact the author at Windsor Forest Stud, Mill Ride, Ascot, Berkshire.

Reference abbreviations

A.M. - *Avicultural Magazine*

I.Z.Y. - *International Zoo Yearbook*

P.Z.S. - *Proceedings of the Zoological Society of London*

Repts. - *Annual Reports of the Zoological Society of London*

Ostrich	1973	Woburn	I.Z.Y. Vol.15,p. 321
<i>Struthio camelus</i>			
Rhea	1841	Sir Robert	P.Z.S. 1841, p.79
<i>Rhea americana</i>		Heron	
Darwin's Rhea	1906	Woburn	A.M. 1906, p.306
<i>Pterocnemia pennata</i>			
Double-wattled Cassowary	1967	Edinburgh Zoo	A.M. 1968, p. 181
<i>Casuarius casuarius</i>			
*Dwarf Cassowary	1864	London Zoo	P.Z.S. 1864, p. 271
<i>Casuarius bennetti</i>			
Emu	1830	London Zoo	Repts.. 1833, p.13
<i>Dromaius novaehollandiae</i>			

*Almost certain to have bred. The species had hatched on several occasions prior to 1864 but the young are recorded as dying. In that year two were hatched, one of which died while the death of the other could not be traced in either the Annual Reports or Proceedings of the Zoological Society of London and no mention of it is made in the Zoo's Day Book.

* * *

CORRESPONDENCE

The Cape Parrot

Further to my letter on 'Sulking in Parrots, in the last issue (Vol. 91, No. 4), the pair of Cape Parrots *Poicephalus robustus suahelicus* (the Central African subspecies) that I mentioned were sitting on four very large, round eggs, have successfully reared four healthy young which are now independent.

Several points have arisen that I find very interesting; firstly, all four young have left the nest with a 1 in (2.5 cm) wide orange/pink band across the crown of the head and with a pink blush through the otherwise grey cheeks. They differ from the adults in not having the orange colouring on their thighs and wing butts and otherwise resemble the adult hen. The adult cocks have no colouring on the crown.

I have read Rosemary Low's excellent article in our magazine in Volume 88 (1982) No. 1, in which she gives a very detailed description of the young of this species. I could find no reference anywhere to confirm whether the young of *both* sexes leave their nest with identical colouring (like that of the adult hen) but it would be too much of a coincidence that these birds should all be hens.

I find *P.r. suahelicus* to be a particularly pretty parrot and while some have a very nervous disposition, this pair and their four young are all very steady (possibly because the adults are tamed pet birds, and the young follow their example). A second interesting behaviour pattern of the four young birds was that all of them, or half at a time, would return to their nest log sometimes for the whole day, for up to 10 days after leaving their nest - unlike most South American parrots with which I have experience.

Thirdly, they nested in a log on the ground and were not at all interested in a natural log that was hung up. The pair tunnelled at ground level into the log and continued to use this entrance until the young hatched and with usage this entrance became blocked and they would then enter from the partly open top.

Fourthly, I have a pair of *P. suahelicus* from Angola and they seem generally duller than *P. suahelicus* from Zimbabwe where my breeding pair come from and the hen from Angola has a much smaller patch of orange/pink on the crown. They are not so attractive as their Zimbabwean cousins.

Then finally, I have experienced, percentage wise, far more stress sickness in Cape Parrots, more so in the South African form *P.r. robustus* than in the Central African race *P.r. suahelicus*, than I have amongst any other parrots that I have kept. All were cured except for one hen *P.r. robustus*, a tame pet bird that I lost. Of nine Cape Parrots in the collection,

five have been sick at one time or another.

I would suggest to anyone keeping these parrots that once they have settled down, they should not be moved.

I find them very attractive, lively and most interesting parrots, and the yellowish neck and darker back contrasting with the orange thighs and wing butts of the South African race most attractive and very different from the pinkish/orange crown and silver neck and light green back of the Central African race.

25th February, 1986.

P.S. It is interesting to note that now the four young parrots reared are over four months old and into their first moult, they have all lost the orange cap on their heads and the flush through their cheeks that they had when they left the nest, but two of them (presumed hens) are now growing a new batch of stronger coloured orange/red feathers on the crown of their heads above the top mandible, similar to the adult female. The other two (presumed cocks) have retained the plain silver head and neck of the adult male.

I could find no reference in any book to the fact that the young of both sexes leave the nest with this crown of orange which both sexes lose after their first moult - when the young hens regrow the orange cap and the young cocks retain a plain silver head and neck.

Breeding from hand-reared birds

As a breeder over many years of a whole range of birds, including lories, I believe a statement by Rosemary Low in her most interesting article on the breeding of the Tahiti Blue Lory (Vol. 91, Nos. 1 & 2) that 'there are still people who believe the myth that hand-reared birds are useless for breeding purposes' needs to be analysed.

In my experience this would all depend upon the reasons for the parents refusing to care for, or feed their young.

It is no myth and any serious breeder of domestic stock, whether it be pigeons, bantams, budgerigars, canaries, cockatiels, etc., will confirm that the young reared by indifferent parents or even if they are taken away and reared by foster-parents, will, when mature, will make indifferent parents themselves, thus confirming that such traits can be inherited. Unfortunately these traits are continually passed on from one generation to another because the parents may possess qualities essential for the show ring. Poor parental characteristics include light-sitting hens, poor brooding hens, erratic feeding of young and after flight care. This, however, would not apply to the wild stock where their very survival depends upon good rearing qualities and any imperfections would have been eliminated.

Birds in the wild select their own mates, but under captive conditions

incompatible pairs are often thrown together, inducing a weak pair-bond. Incompatibility is not an inherited trait, and young hand-reared from such a pair would have all the normal characteristics expected of them. The incompatible pair can be broken up and offered other mates and subsequently become perfect parents.

Again, many wild birds, after hatching their young, change their diet completely and unless this stimulant to feed was provided under captive conditions, you would get poor parental and feeding reactions. This is also not an inherited trait, for with a change of diet, or presentation of the food, this could be altered, and therefore young hand-reared from such a pairing could be expected to have normal parental qualities.

The preference of some hand-reared birds for human company rather than their own kind does sometimes pose further problems but this bond can be eradicated or weakened by placing weaned young together, or with their own kind, at an early age.

If the human contact continues through to maturity, then many more problems will arise.

Mitchell Park Aviaries
Durban, South Africa.

W.D. Cummings

* * *

Hardiness of a Twenty-eight Parakeet

In the first week of November 1985 my cock Twenty-eight Parrakeet *Barnadius zonarius semitorquatus* ate his way out of his aviary and I did not see him again until 19th February when I heard him calling in a tree above a hen Port Lincoln Parrakeet *B.z. zonarius*. He disappeared for the rest of the day and then reappeared in the evening of the next day. He was around the aviaries all the afternoon of 21st February and on the morning of 22nd February he went through the opening which I had made at the top of the aviary next to the Port Lincoln hen and he went straight away and fed her through the wire.

This bird was at liberty for approximately three months, latterly during one of the coldest periods for many years, the temperature remaining below freezing point for over two weeks.

As a postscript to this story, a fellow builder who lives a mile away from me recently told me that he had been feeding a green and yellow parrakeet on his bird table from November onwards but that it had now disappeared. I had to tell him that it was my bird and I had caught it up.

A very large Indian collection

I recently heard from a friend in India, Dr. Mohan Patel, a member of his Society, who sent a cutting from a newspaper, *Gujarat Samachar*, dated 27th December 1985, recalling that the Indian Congress (now Indira Congress), recently celebrating its centenary in Bombay, was founded by a British citizen, Sir Allan Hume. The newspaper related that Sir Allan Hume was a lover of birds and in the extensive garden of his house in Simla he collected some 62,000 birds from different countries. I wondered whether any of our readers knows more about what must rate as one of the largest avicultural collections ever?

Parklands, Shoulton,
Hallow, nr Worcester.

K. Dolton

Ed. History books reveal that Allan Octavian Hume (1829-1912) worked in the Indian Civil Service for some 30 years and on his retirement took up the cause of Indian nationalism and founded the Congress which became and remained the chief political party of the Hindus. They elected him their first Secretary, a post he held until shortly before his death. He was an ornithologist with an international reputation; he organised bird observation all over the country and wrote the first book on Indian birds. I can find no mention of this enormous collection of birds at Simla. Can anyone tell us more? And was this the Hume for whom the Bar-tailed Pheasant was named?

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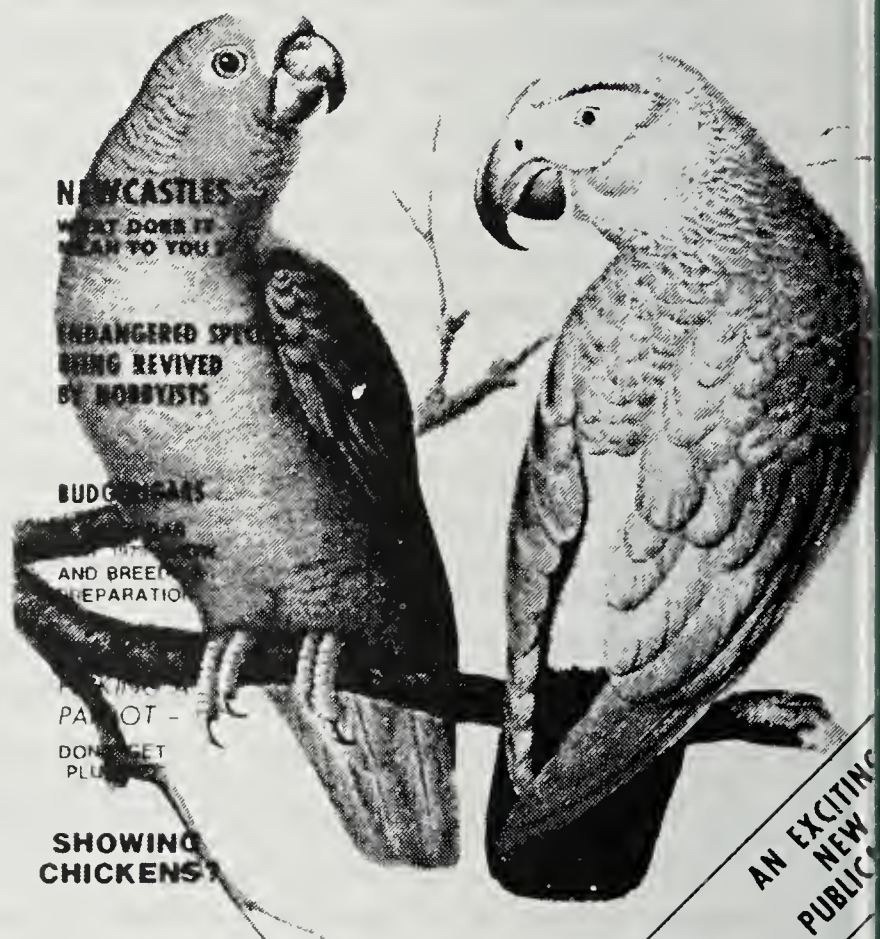
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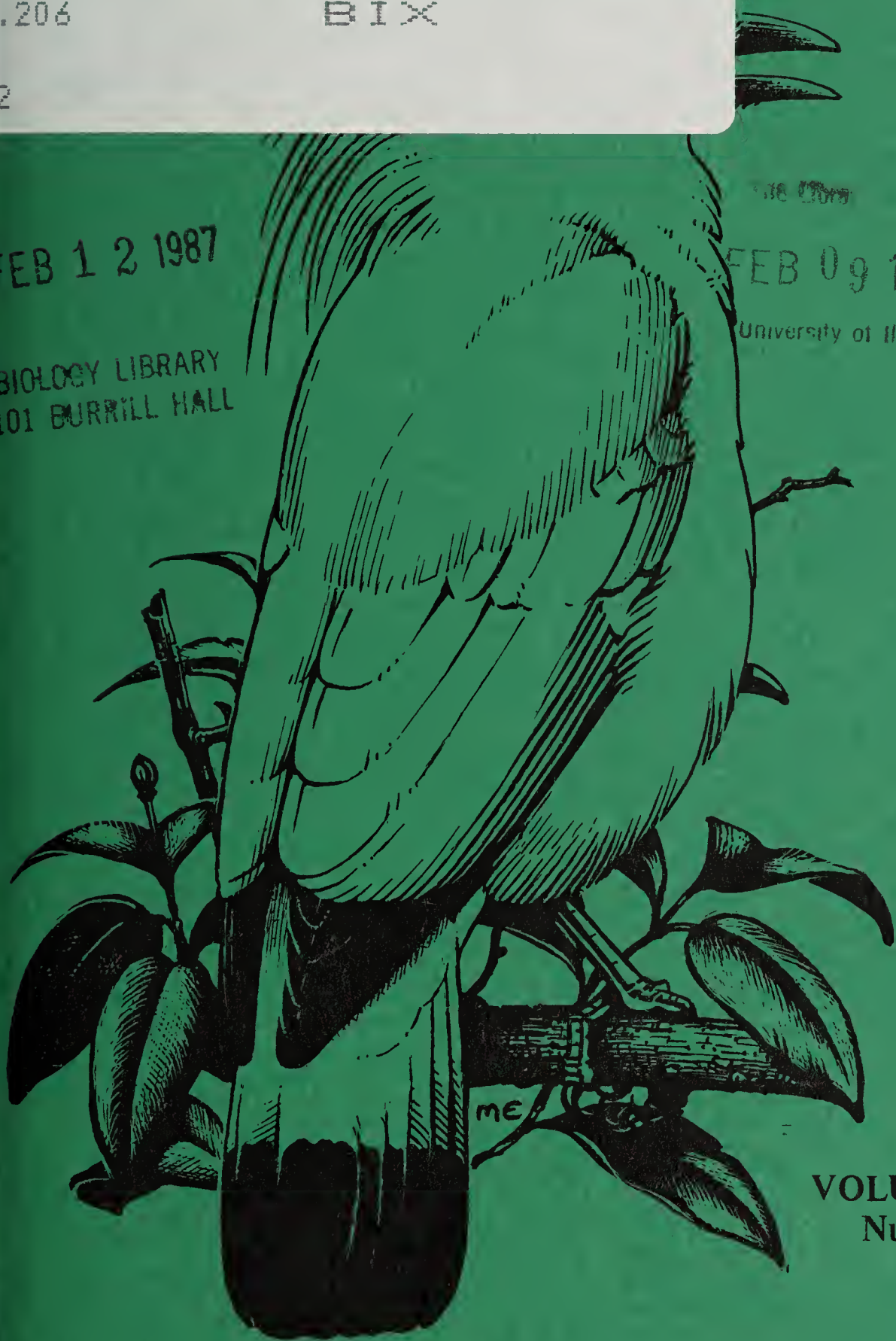
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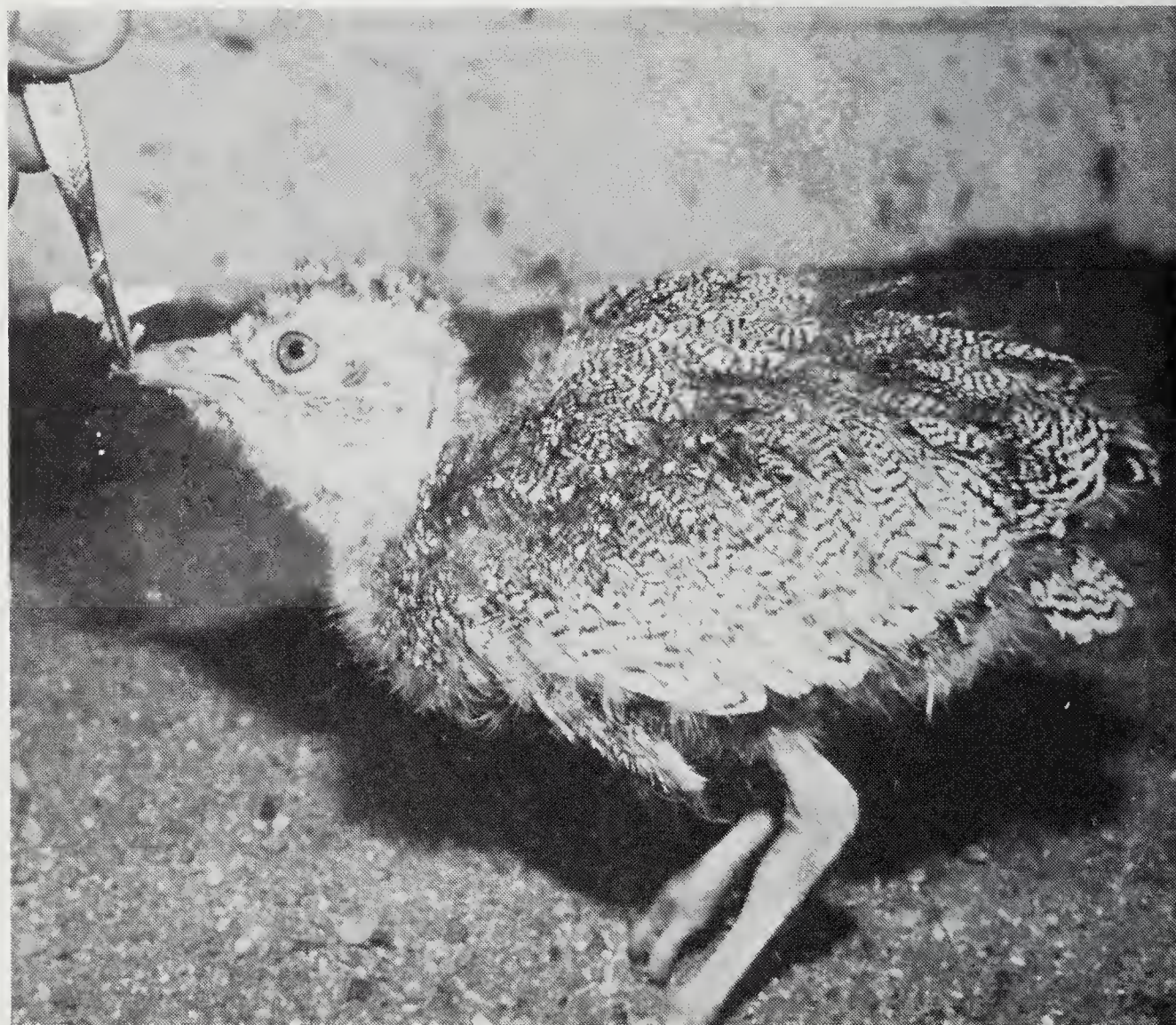
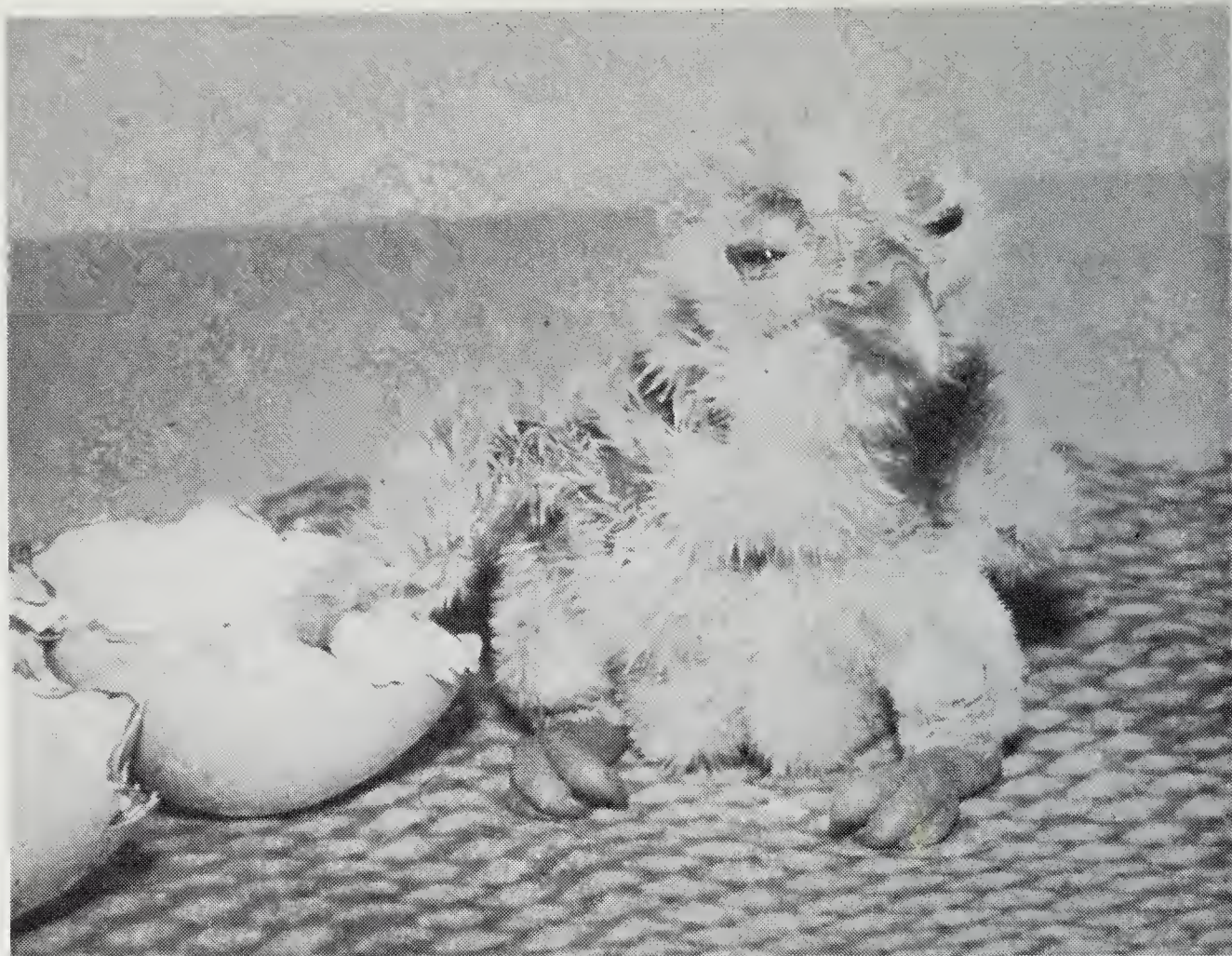
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Paignton Zoological and Botanical Gardens
 Little Black Bustard bred at Paignton Zoo
 Top, One day old; bottom, approximately three weeks old

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BREEDING THE LITTLE BLACK BUSTARD *Eupodotis afra* AT THE PAIGNTON ZOOLOGICAL & BOTANICAL GARDENS

By Miss JO GREGSON (Head Birdkeeper)

The Little Black, or White-quilled, Bustard, also known as the Black Korhaan, is found in open grassland and amongst scattered trees and bushes, throughout the central, southern and western regions of Southern Africa. Our pair of Little Black Bustards were acquired in February 1979 from a dealer and were adult on arrival. During the following three years, spent in the 'Square' aviaries, they failed to nest and at the end of 1983 it was decided to rehouse the birds in a planted aviary, approximately 13 m x 4 m x 3 m high, at the Tropical House.

On 13th April, 1984, one egg was laid in a shallow scrape, no nesting material had been used. This egg was removed to be artificially incubated but was soon found to be addled.

A second single egg was laid on the same scrape on 8th May and left for the female to incubate. The chick hatched on 28th May, but again, since there was a real risk that it might drown in a small pool in the aviary, the chick was taken for hand-rearing. Initially it was fed on crickets, small locusts, white mealworms, chopped lettuce, egg and grit; water was given in drops from a hypodermic syringe. Calcium/magnesium was given daily to prevent bone deficiencies. All food items had to be offered by means of tweezers as the chick made no effort to feed itself.

On the third day the chick became lethargic and failed to defaecate, a problem not uncommon in hand-reared bustards. One ml. of liquid paraffin was administered and a day-old Lady Amherst's Pheasant *Chrysolophus amherstiae* was caged with the chick in order to improve its feeding and exercise. The Bustard improved over the ensuing 24 hours and soon began to feed from the dish. The pheasant chick was removed after a few days.

At six days the wing quills were growing fast and by the fifteenth day the chick was quite well covered. It was able to spend some time outside on warm days. Small pieces of cooked, minced chicken and liver heart, and lumps of mice were now added to the diet.

On the 19th day the chick began refusing food from the dish and would only take an occasional cricket from the tweezers. This continued for six days, after which it was completely independent of the tweezers and feeding well once again from the dish. The young bird became unexpectedly nervous and on day 59 was moved to a planted aviary at the Tropical House. At six months old it still bore immature plumage though it was 'barking' like a male.

A third egg was laid on 13th June in a scrape barely a metre from the original. This egg hatched on 2nd July, the chick was again removed for hand-rearing but died at 16 days. A post mortem examination revealed an acute enteritis.

A fourth egg was laid in the same scrape on 23rd July and hatched on 13th August. It was decided on this occasion to allow the adults an opportunity to rear their own young. The chick was brooded and fed by the female and appeared to be doing well until 12th September when it was found dead in its roosting place. The cause of death was inconclusive.

In each case the incubation period was 21 days. The first egg weighed 43 g and measured 41 x 52 mm. All three chicks began developing a slipped wing at about six days but this corrected itself after approximately 14 days.

Subsequently, clutches have been hand-reared and parent-reared during 1985.

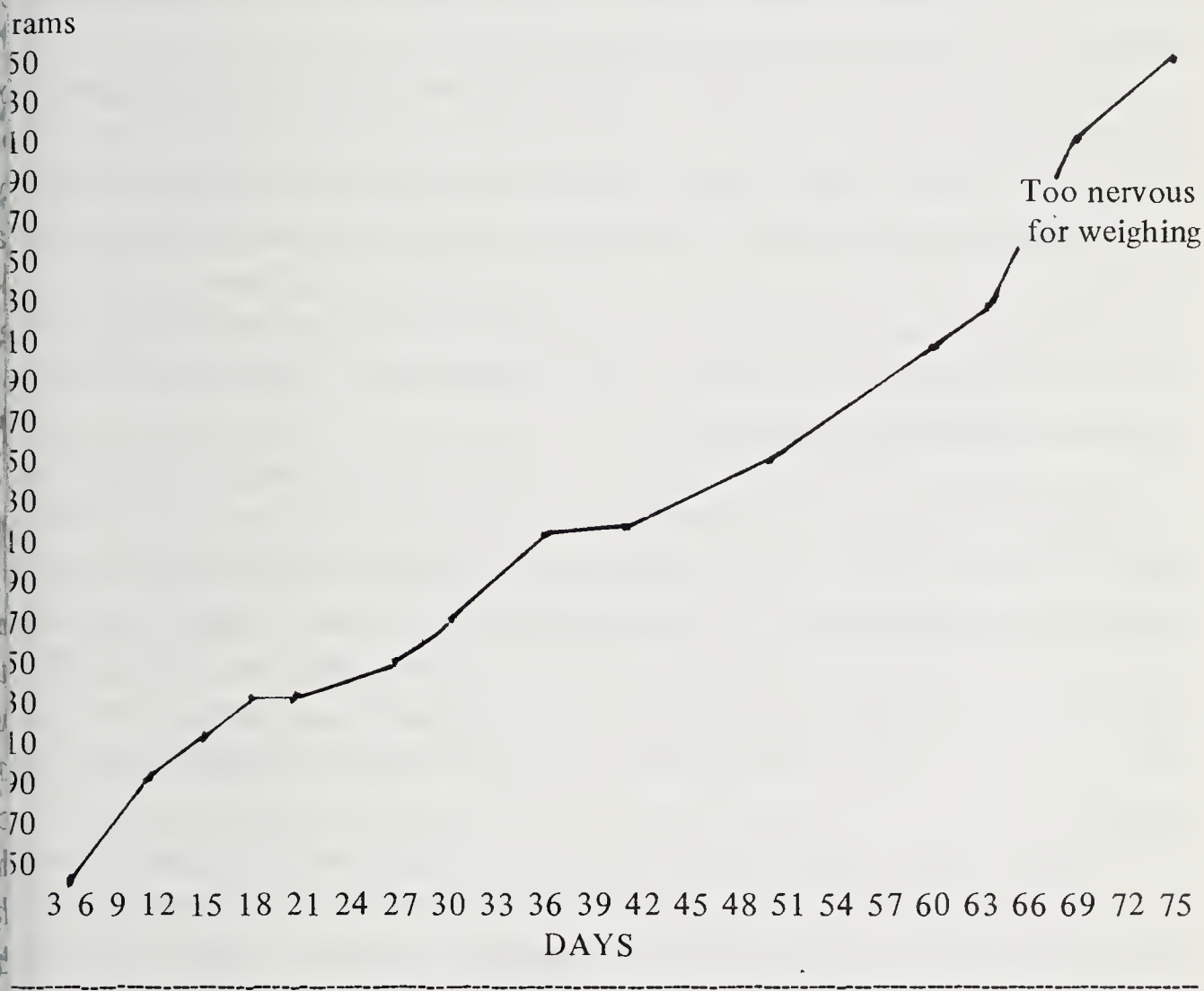
The down of the chicks is grey speckled with brown and black. The bill and feet are grey. The juvenile plumage in most respects is similar to that of the adult hen. It would appear that immature cocks begin to colour black on the neck at around seven months when they also develop the characteristic bark of the adult male. Interestingly, the first bird to be hatched in May 1984, though now in full male plumage, still retains the eye coloration of the hen. The last chick to be hatched, now five months old (January 1986) is showing pale dorsal streaks and we believe it to be a hen, with which it agrees in all other respects. This being so, it is the first of its sex thus far reared.

Two cock birds are now housed in an adjacent enclosure which is especially spacious and heated and planted. Though they do not actually come to blows, each remains constantly away from the other. The youngest bird is still with the adult pair while the remaining hand-reared offspring is caged elsewhere in the collection.

Other than the inclusion of many more insects (collected by means of a sweep net) and mealworms, crickets and small locusts, the diet remained unchanged during the breeding season. In order to 'protect' her young, the hen often feigns injury and on occasions even attacks! At such times, the cock runs off barking loudly and incessantly. The hen alone broods her

Young and initially feeds it while the cock stands guard, again barking if alarmed. As the chick grows it will follow the cock as often as the hen although this may represent greed since the male is often the first to the feed bowl! Nevertheless the chick always retreats to the company of its mother when alarmed.

WEIGHT CHART FOR LITTLE BLACK BUSTARD



As described above, the Little Black Bustard *Eupodotis afra* has been bred at Woburn Zoo and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

BREEDING THE PALE-HEADED MANNIKIN

Lonchura pallida

By ALAN GRIFFITHS, MRCVS

(Dyfed, Wales)

The Pale-headed Mannikin, or Pale-headed Munia, or Pale-headed Nun, is, according to Goodwin (1982), found in south-west and central Sulawesi (Celebes) and neighbouring islands of Lombok, Sumbawa, Flores, Alor, Savu, Kisar, Sermattu, Babar, Kalaota and Madu.

In shape and size it is similar to the commoner White-headed Mannikin *Lonchura maja* except that the head is more of an off-white colour, and the breast is a pale pinkish grey. The rest of the body is chocolate brown to reddish chestnut, and the latter colour, especially over the flanks, glows in bright sunlight and makes this a most attractive finch.

Four birds were purchased from a dealer in September 1983 and were wintered together in an indoor room without heat, though the temperature did not fall below freezing.

In the spring of 1984 they were all placed in an open sheltered aviary 8 ft long x 6 ft high x 3 ft wide (2.43 x 1.82 x 0.91 m), the floor being of slate slabs, a bucketful of farmyard manure and a bucketful of leaf mould was placed in the front of the aviary, and kept moist. This is a practice carried out for all the smaller finches that are likely to breed. White worms were provided at first but were discontinued as they were not taken. In fact, livefood is unnecessary as subsequent chicks were reared without.

A variety of nesting sites were provided inside the shelter and outside these included lovebird boxes and open finch boxes but the nest first used was a hollow tube of wire netting filled with hay and a nest cavity made inside. This was in the shelter.

Five eggs were laid in June and it was my intention to foster them under some Bengalese but the latter chicks hatched before the transfer could be made, so the Mannikins were allowed to continue their duties. Three chicks hatched and subsequently left the nest but unfortunately one was picked up dead after a downpour a week later.

The pair went to nest again in an open-fronted finch nest-box under shelter and reared a further two to independence.

All eight birds were brought in to a birdroom in September 1984 and heat was provided from November onwards until the following spring. Unfortunately two of the young died during the winter before coming in to adult colour, which the other two did before being replaced in the

outdoor aviary.

The juvenile Pale-headed Mannikin has a brownish buff head and breast; the wings and tail are light chocolate, and the beak is similar to adults but perhaps a little more grey, and the legs are dark brown.

The remaining six birds shared the same aviary and although the adult birds had been rung with split rings the previous autumn, these had disappeared during the winter. Nesting started late but subsequently two chicks left the nest in late September. Unfortunately these were found dead on my return from being away for a few days.

The six birds were brought indoors at the end of September 1985 and I tried to split them into pairs by appearance. Each pair was similarly housed in cages 3 ft long x 1½ ft wide x 2 ft high (0.91 x 0.45 x 0.60 m); open-ended finch nest-boxes were provided which faced the length of the cages, and were filled with hay which was hollowed out to make a nest chamber. More hay and coconut fibre were provided as well as heat from November onwards.

One pair threw out all the nesting material, the other just sat in the box, but the third pair laid five eggs, three of which hatched on 2nd January. The chicks left the nest on 19th January and were feeding independently by 5th February.

The diet consists of a mixture of 50% white millet and 50% canary seed, to which I add Japanese and red millet, plus a little niger and maw seed. In addition, the above mixture is provided soaked, plus some soaked paddy rice and Ce De. Millet sprays, both dry and soaked, were offered but were not popular. During the summer, meadow grasses were provided and ornamental grasses such as *Miscanthus sinensis*.

Cuttle fish 'bone' and grit were always provided and when the birds were indoors, a few drops of Abedec were occasionally added to the drinking water.

At the time of writing (6th March 1986) the same pair have now laid another clutch. The other 'pairs' are still not doing anything.

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As described above, the Pale-headed Mannikin *Lonchura pallida* has been bred by Mr. A. Griffiths and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

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BREEDING GOLDEN-FRONTED CHLOROPSIS

Chloropsis aurifrons

By L. GIBSON

(Burnaby, British Columbia)

The general habits, etc., of this species have been described earlier (*Avicultural Magazine*, 1981, p. 34). The birds nested in the conservatory as described for *Cyanerpes* (*Avicultural Magazine*, 1979, p. 6). As mentioned previously they can be sexed by the blue on the throat; the female has two stripes, joined only at the top, while the male has a solid patch of blue.

Courtship was rather hectic and consisted of chasing then sitting screeching at each other. The cock seemed to like hanging upside down below the hen, on the same twig. The breeding pair picked one another from a group of five and, apart from mild quarrelling on occasions, they were still quite friendly almost a year later. This shows the importance of natural selection. It was fortunate that they had a few to pick from for most of the time we stick two birds together and that is that, and I have consistently had trouble doing this with Shamas, for example.

The aviary was shared with a pair of Silver-beaked Tanagers *Ramphocelus carbo* which nested first. They were taken out later when the *Chloropsis* nested. General breeding procedure was identical to *C. hardwickei* and only additional information is given here.

Nests

Four nests were built and all were constructed of grass and horse, or cow, hair only. A wide range of materials was made available. Three were reconstructed *hardwickei* nests, and one was a new nest. The latter was used twice, and was the only successful nest. Eggs were laid in only one of the other nests. The dimensions were identical to the *hardwickei* nests.

The first nest was a reconstruction of the old *hardwickei* nest, in bamboo. It was started on 6th April, 1980. The horse hair lining was taken out and replaced. The sides were partly dismantled and reconstructed, giving them a slightly more open weave than the original and the lining was also sparse. The nest was completed but not used. On 1st May, the hen began to reconstruct the second *hardwickei* nest in the creeping fig, against the wall. This time it had a thicker lining. It took only two days to refurbish, and the first egg was laid on the third day. The cock was seen to carry a piece of grass at this time but he did not do any work and was not seen to do this again. The third nest was yet another reconstruction of the

first. Each time the lining was taken out completely and replaced. This was still not used and a fourth was started. This nest was completely new and situated in the creeping fig, but at the same height at the opposite end of the wall from the other. It could not be seen except from a step ladder which was immediately installed.

All the nests were firmly fixed and lined only with black or red hair, white hair being ignored. When the new nest was finished, the pad of horse hair lining the base was found standing on end. It had probably been pulled up by the birds' claws when leaving. This was stitched back in using black thread and at the same time, some loops were sewn around the rim. This turned out to be a good idea, for by the time a chick left the nest, it was still as good as new. There was previously some trouble with nest rims unravelling a lot. As a further precaution, a twig was wired in place just in front of the nest. Previously there had been nothing to land on except the nest rim.

Eggs and incubation

Prior to laying, the hen began to consume increased quantities of food. This consisted of insects mostly and when these were put in, the cock immediately called the hen down to them (and still does). In contrast to the *hardwickei*, he fed her regularly. However, no food was taken to her while she was on the nest.

The clutch consists of two eggs. Three clutches were laid: the first was started on 3rd May and the last on 16th August. The eggs were slightly smaller than those of the *hardwickei*, being 20 x 16 mm. All had a pale reddish brown wash except for one which was white. They had large reddish-brown spots sparsely concentrated at the big end, with a very few smaller spots petering out around the middle. Some eggs had pretty mauve spots interspersed among the brown ones.

As with *hardwickei* there was some delayed hatching. The first egg was chipped open by me when it was 15 days old, possibly 16, depending on whether it was the first or second laid. A live chick, more or less ready for hatching, tumbled out and the parents fed it within five hours. The other egg in the clutch was fertile but had died at about the 5th-6th day period. Both chicks in the second nest had hatched by 10.00 a.m. on the same day, after 14 and 15 days' incubation. When the hen was incubating, the cock sat at the opposite end of the aviary and, in contrast to the silent vigil of the cock *hardwickei*, he occasionally sang quietly. When the hen left the nest he flew close by her but never went near the nest while there were still eggs in it. Temperatures ranged from a low of 52°F (11°C) at night, to a daytime high of 80°F (27°C) for the clutches which hatched.

Chicks

These were just the same as the *hardwickei*, being rather small and very slow to develop for the first three or four days. Both parents fed actively from the first day. Only insects were used at first, being mostly wasp pupae and larvae, spiders, grasshoppers and termites. The latter were conveniently obtained by sawing up lengths of my sundeck - about two years before, a toucan upset a jar of these insects in the sundeck and apparently some escaped and settled underneath it!

On the seventh day the hen fed some rice to a chick, but it could have been getting it earlier. The chicks opened their eyes at six days, one opening and closing its eyes on the fifth day. This was the main difference from the *hardwickei* chicks which were much later. The *Golden-fronted Chloropsis* chicks were difficult to induce to beg but nevertheless were easier than the *hardwickei*. They sometimes sprang up at the first tap. All were fed from the second day onwards with egg/butter/milk.

The sole chick to hatch in the clutch grew well and was very fat by the 13th day, in fact it weight 27 g, which was too much. In spite of growing well, its primaries had not come out until the 10th day in comparison with the seventh day for the other chicks. The feathers were all well formed in spite of this. The chick was very quiet and did not object at all to being lifted out. Its parents hopped about angrily nearby, uttering explosive whistles whenever the chick was handled.

At 16 days the chick flopped from the nest and was obviously not normal. It could only flap its wings a little and sat holding its feet up, resting on the first joint. It seemed incapable of stretching its neck out fully and squeaked, possibly in pain, when this was done by hand. It was placed on a concrete block and the parents continued to feed it. It jumped off the block several times but could not move from where it landed. It had very little grip in its feet and two swellings were apparent on its legs. These grew progressively larger by the day. The legs began to bend at the swellings, which became inflamed. The parents tried desperately to get it to fly. They were carrying nesting material by this time. The chick was taken indoors at 18 days, started on antibiotics, and hand-fed.

The next day it was seen eating and drinking without trouble, but had difficulty moving to and from the food. It was given aspirin and this made it much brighter. It had been squeaking in pain quite often whenever it moved. Swelling was also noted in a wing joint. The chick died the following day in great distress. A post-mortem examination showed that both legs seemed to have been broken and there was much recalcification going on. It also had problems with its neck and wings. It had been hand-fed with what should have been plenty of calcium and vitamin D. It did not

have the appearance of an 'ordinary' rachitic chick (which is much more mobile) and was otherwise plump and well-developed. It was more likely that this chick had a malabsorption syndrome for calcium or vitamin D, and nothing would have saved it. Rickets can usually be corrected fairly well by simply supplying vitamin D, but this chick got rapidly and progressively worse.

The second clutch to hatch was laid on the 15th and 16th August and both chicks appeared on the 31st. Everything went smoothly until one chick died suddenly at almost 10 days old, with no previous signs of distress. The cause of death was easily established. Its little stomach was more than three-quarters filled with six pieces of pumice stone. Pumice is, of course, very light and the largest piece weighed 115.5 mg, but it measured 7 x 5.5 x 3 mm. Total weight of the six pieces was 205 mg. A flower pot with potting soil containing pumice fragments had been put in some time during this nesting and was removed two days before the chick died. It is not known whether the stones were fed as grit or, more probably, as minerals. The first chick had no grit at all in the stomach. It would be a good thing to feed grit and/or eggshell to all birds to avoid this, as I have had at least one previous chick killed by getting relatively large stones fed to it.

The other chick probably got fed pumice fragments also, but it was the larger of the two and as each day went by, it became safer. It developed uneventfully, leaving the nest at 13 days and thereafter followed the Hardwick's chick in development. As previously postulated, it was indeed green all over; the only difference from the *hardwickei* chick being the top of its head. It had a lighter green patch where its orange crown would be. It gradually moulted into adult plumage at three to four months old, and proved to be a male.

The parents started to moult when the chick was about three weeks old and they were very quiet and friendly. They remain so to this day. An interesting thing happened with their feeding habits. They did not go over to insects quite as much as the Harwick's, although they obviously preferred them. They were also much less fussy, eating even mealworm beetles, although they did pick out only the softest larvae and pupae for the chicks. They did not take any nectar during the nesting period, scarcely bothered with it thereafter and have hardly taken it since. It is offered every month or so, just to check, but is usually ignored. They have settled to a staple diet of rice pudding and orange, with a little banana and as many mealworms as can be spared.

BOW LEG SYNDROME IN RATITE BIRDS

By Dr. P. GUITTIN

(Veterinary Surgeon, Paris Zoological Park, Paris, France)

Summary

From 1981 to 1985, various changes were made in the hand-rearing of Ostrich, rhea and Emu chicks at the Paris Zoological Park to determine environmental and nutritional factors involved in the excessive growth and low survival of chicks with bow legs.

Introduction

Leg deformities occur in ratites in many zoological parks (Guittin, 1985). Various known as perosis, leg disorders, musculo-skeletal disease, slipped tendon, and spread leg (Wallach, 1970; Walser *et al*, 1982; Reece & Butler, 1984), bow leg syndrome may best describe the leg deformities commonly found in several ratite birds. Leg bone deformities have been reported in the Ostrich *Struthio camelus*, the Greater Rhea *Rhea americana*, Darwin's Rhea *Pterocnemia pennata*, the Emu *Dromaius novaehollandiae*, and cassowaries *Casuarius* spp. (Bruning, 1973; Cordonnier, 1977; Reece & Butler, 1984). At Paris Zoological Park, the usual history of birds with bow leg syndrome is that the eggs were artificially incubated and the newly hatched chicks were overfed, grew rapidly for the first month and developed leg deformities by two to eight weeks old. The purpose of the present study was to show nutritional and behavioural causes of the disease.

Materials and methods

At the Paris Zoological Park, eggs of three species of ratite birds (*Struthio camelus*, *Rhea americana*, *Dromaius novaehollandiae*) were artificially incubated (36.7°C and a relative humidity of 65%) and were automatically turned every two hours. Seventy-eight Ostrich, 87 Rhea and 51 Emu chicks had been hand-reared after hatching: 12 Ostriches, 20 Rheas and five Emus were weighed and measured every day for the first two months after hatching, then every week thereafter. Chicks of less than 5 kg were weighed in a high box, using baby scales (1% standard error). Heavier chicks were double-weighed, using converted bathroom scales (4% standard error). The height of each chick was determined by use of a measuring apparatus (5% standard error), without disturbing the chicks. Four heights were evaluated: the head height, measured at the top of the cranium; the back height, at the first dorsal vertebra; the hip height, at



P. Guittin

Tarsometatarsal bones of a one-month old Rhea;
on the left, bone showing the bow legs syndrome, and on the right, normal bone

the coxofemoral joint; and the tarsus height, at the tibiotarsal joint. Growth curves were drawn up, using the mean of the observed heights, while histological and serum biochemical evaluations were carried out to gain further insight into this syndrome.

Predisposing factors

During the first two months, the low survival might be attributed to the lack of appropriate husbandry techniques. Also, the lack of attention normally provided by the male adult in natural rearing, made the chicks more inactive. If chicks have no encouragement to develop their muscles, they do not use their leg joints sufficiently. This in turn can lead to generalised weakness and deformities becoming apparent.

To encourage activity, several techniques were devised. It was important not to keep a chick alone as the presence of other chicks, and indeed adult birds, encouraged ratite chicks to move about. The floor surface also influenced the chicks' behaviour. Early on we found that an edible surface, such as litter or grass was not suitable because young chicks would eat it and suffer impactions. On the other hand, a ground that was too hard became painful for the chicks to walk on, leading to inactivity. We decided that a floor of jute or straw was a good compromise for younger chicks as these materials were not eaten by chicks, and provided adequate traction with satisfactory firmness. For two-month old birds, a short area of grass gave the optimal results. It was also necessary to consider the size of the enclosure to encourage movement. About 2 m² for young chicks up to two months old was satisfactory. Then we gave midges and flies which kept chicks busy looking for and catching these insects and other invertebrates.

Yet exercise is not considered the only factor responsible for strengthening legs. We found that restrictions on food intake prevented bow legs and that a nutritionally adequate diet improved the survival rate. Also when we had quantitatively reduced daily food intake, the bone pathology had largely decreased (Table 1). We had understood that this syndrome was correlated with overfeeding. Studies of diet had shown a reduction in food intake corresponded to a specific reduction in metabolizable energy requirement. Energy nutrients such as cereals or pellets for carnivores or poultry induced risk; also it might be important to raise the calcium level of the diet since chicks developed a calcium deficiency. During the first two months, ratite chicks had a rationed diet (Table 1). Then from two to 12 months old, ratite birds had a diet which was given *ad lib.* but was qualitatively restricted (Table 2).



P. Guittin

Two-month old Rhea with inflammation of the tibiometatarsal left joint

TABLE I - DAILY DIET (in grams) OF ONE-MONTH OLD RATITE CHICKS

Diet	Ostrich	Rhea	Emu
Shredded lettuce and alfalfa	600	100	100
Shredded carrot	80	100	100
Hard-boiled egg	30	0	0
Rabbit pellets	50	25	45
Wheat	0	0	0
Pulverised eggshell	5	5	5
Mineral and vitamin supplements	5	5	5
Total	770	235	255

TABLE II - DAILY DIET (in percentage)
OF TWO- TO TWELVE-MONTH OLD RATITE BIRDS

Diet	Ostrich	Rhea	Emu
Shredded lettuce and alfalfa	50	35	29
Shredded lettuce and apple	12	27	22
Hard-boiled egg	3	0	0
Rabbit pellets	13	36	30
Wheat	20	0	17
Pulverised eggshell	1	1	1
Mineral and vitamin supplements	1	1	1

Epidemiology

We made a retrospective investigation with rhea chicks. The chicks were divided into three groups: group 1 was composed of five chicks that developed bow legs between 23 and 31 days old; group 2 was composed of five chicks that developed bow legs between eight and 11 days old; group 3 was composed of 10 control chicks that showed a normal growth.

During the first week, group 2 had been heavier than the controls (group 3) from the fourth day (Fig. 1). But a significant difference ($p < 0.05$) only became apparent at the ninth day, with the first onset of symptoms. During the first month comparison between groups 1 and 2 showed a significant difference ($p < 0.02$) at 17 days old, before lameness was seen (Fig. 2). So it was possible to identify a presymptomatic period of this disease, from three to six days before the first clinical symptoms appeared.

FIGURE 1 - Comparison of weight increase of three groups of Rhea chicks during the first week

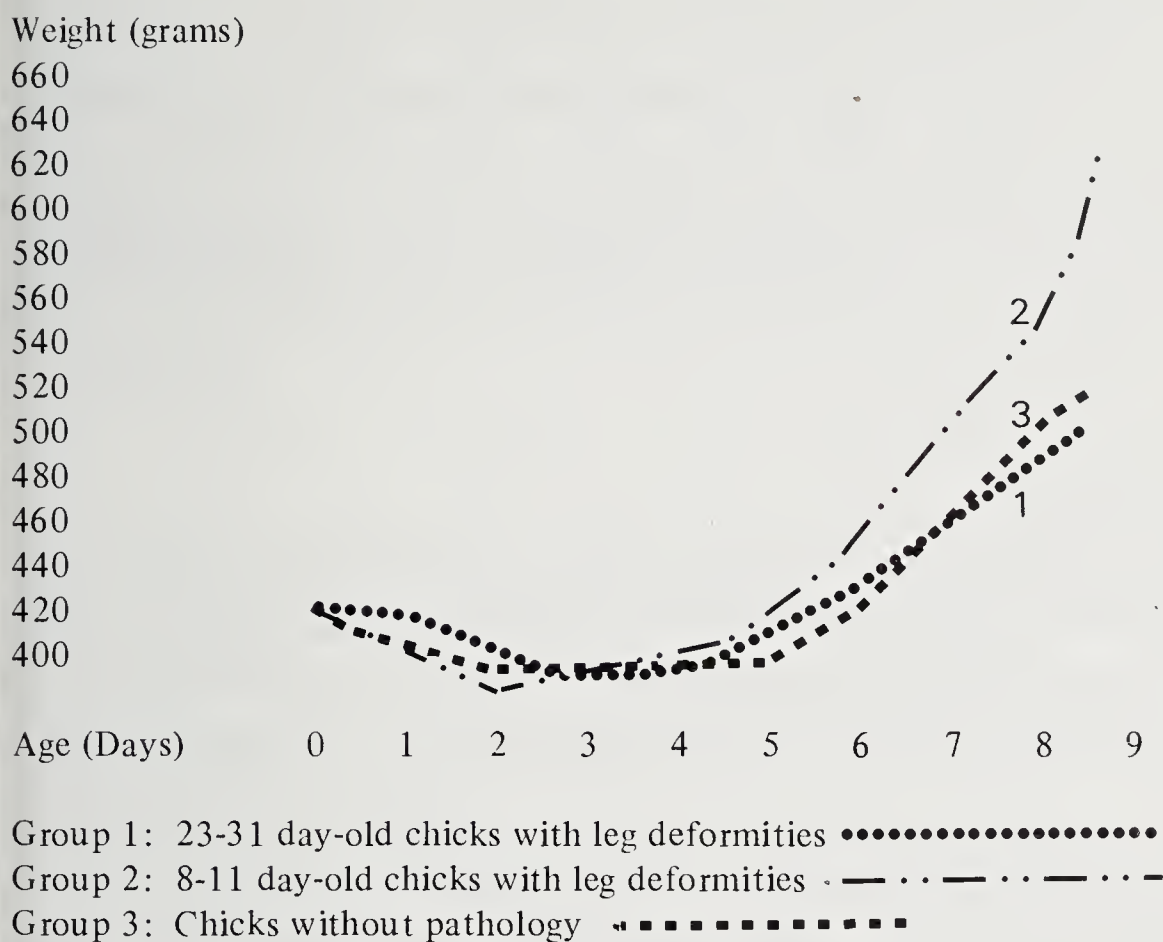
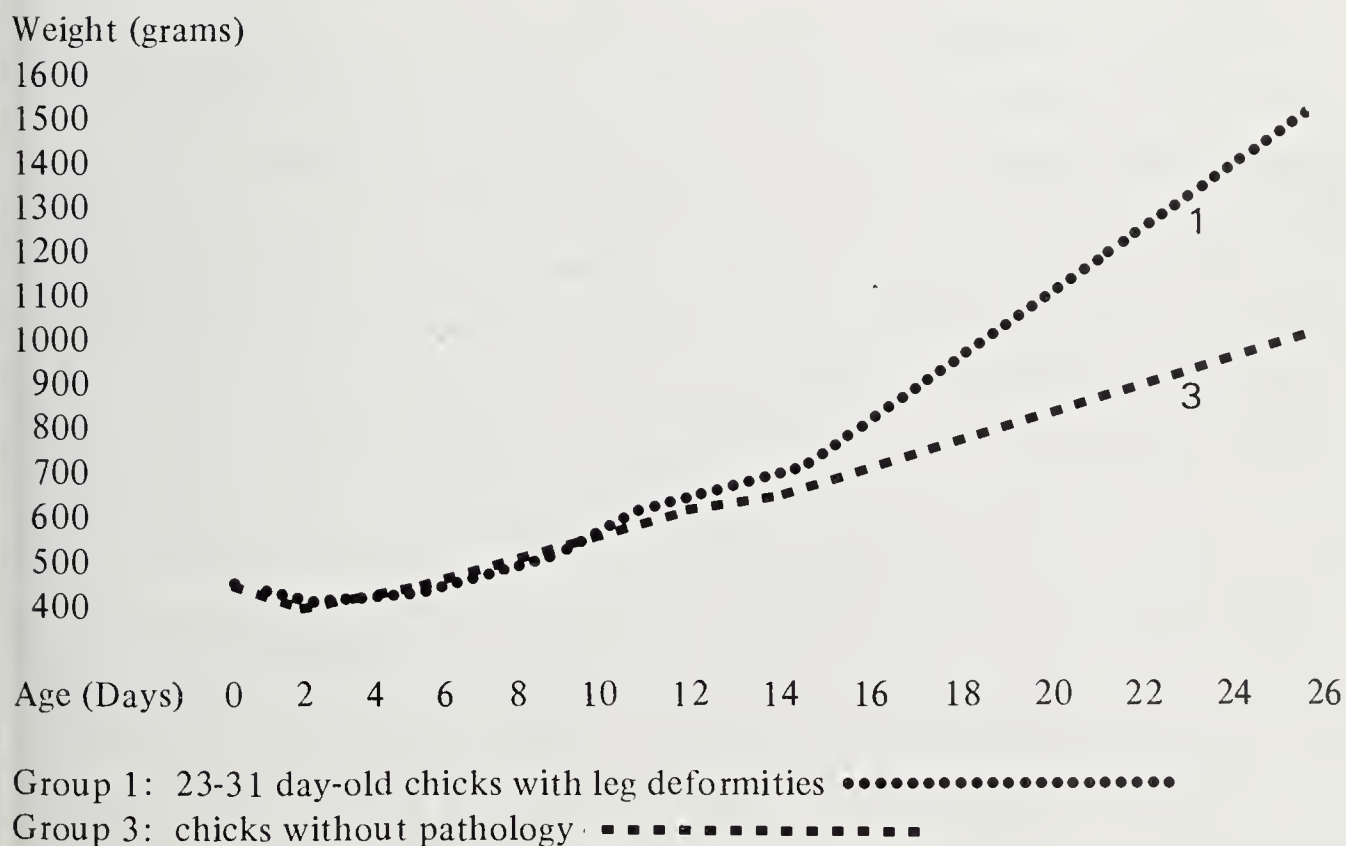


FIGURE 2 - Comparison of weight increase of two groups of rhea chicks during the first month



By daily analysis of the chicks' weights, we were able to note a pattern of growth preceding bowing of the tarsometatarsus. Measurements showed that a rapid weight increase preceded a spurt of tarsometatarsal growth just before the lameness appeared. These chicks might be growing so rapidly that they were unable to metabolise enough calcium and their legs started bowing (Guittin, 1983). The weight of the chicks which were kept with the male did not increase so rapidly since they were too busy chasing flies to eat the food prepared for them (Bruning, 1973). Their growth was correspondingly slower and they did not develop leg bowing. These results suggested a way to prevent this syndrome by reducing the food intake to slow down early growth.

Growth Findings

Signs of lameness were more frequently seen in rheas than Ostriches or Emus. The earliest leg deformities were apparent in eight-day old rheas. The second week after hatching was the first of the two critical periods. At this stage leg growth was rapid, and abnormal lateral twisting and inflammation of the tiobiometatarsal joint could be detected. Initially, twisting would develop, without lateral rotation of the tarsometatarsus. Three days after onset of lameness, rheas with a tibimetatarsal twisting up to a 70° angle. Ostriches and rheas could also develop a bowing of the tarsometatarsus. Eventually chicks developed lateral rotation of the distal third of the tibia, which progressed until the gastrocnemius tendon luxated off the medial condyle and the chick was unable to stand or walk normally as a result.

Generally, Ostriches and Emus began to show clinical signs of bowing at four weeks old; rheas developed the bow leg syndrome during the second critical period, between six and 12 weeks old. Younger ratite birds showed the most severe bowing deformities. Several one- to two-month old ratite chicks began to develop bowing of the tarsometatarsus, a bulbous and inflammatory enlargement of the proximal tarsometatarsus, and persistent lameness. Inflammation of the tibimetatarsal joint was constant with bow leg syndrome. In rheas, during the second critical period, development of bow leg was always associated with deformities of the leg bone. Tibiotarsal and tarsometatarsal deformities were seen most commonly in the heaviest ratite birds.

The tarsometatarsus was often twisted with an inflammatory proximal third and the tibimetatarsal joint was highly congested. The distal tibio-metatarsal and proximal tarsometatarsal bones were poorly vascularised. The periphery of apex of these bones was severely eroded. Deformities of the tibiotarsus were frequently associated with tarsometatarsal dyschondroplasia.

Two-week old and eight-week old ratite birds, especially rheas, sometimes had tibiometatarsal joint inflammation. Macroscopic examinations systematically indicated congestion of the tibiometatarsal joint, inflammation of the proximal tarsometatarsal bone, and abrasion of the distal tibiotarsal and proximal tarsometatarsal articular surfaces.

Clinical studies. Details of these findings, too long to include in this article, are available from the Editor on request.

Treatment

If no corrective or preventive measures were taken, the bowing became so bad that the ratite chicks were unable to stand up, but it was very difficult to stop the bowing if symptoms were too severe. The only treatment was to give concomitantly easily assimilable calcium and injections of multi-vitamins, including from 20 to 40 micrograms of vitamin D₃ a week. But for these corrective measures to be successful it was necessary to begin very early, 24 hours after the first symptoms appeared and to continue for two months.

Bone and plastic surgery, to reduce overstretched ligament of the tibio-metatarsal joint did not satisfactorily improve stability of legs and so we always saw a recurrence of the disease. Sometimes fixing an elastic band around and between the legs was successful in keeping joints in position if this treatment was applied just after the first symptoms appeared during the first critical period.

Prevention

In the first instance, manipulation of the diet in two ways is considered essential: the energy content of the food should be decreased by limiting cereals and pellets to the absolute minimum and offering alfalfa, carrots and apples; secondly, mineral and vitamin supplements including especially calcium and Vitamin D₃ should be increased. But chicks were very selective eaters, and they could leave the supplement but eat relatively greater quantities of pellets. These birds grew rapidly and developed bowing. However, to give the chicks repeated injections was not very good for them because they had to be caught and showed signs of stress. Our experiments showed that supplementation in the form of pulverised eggshell which would adhere closely to fresh food would be eaten. Chicks should be kept on a calcium supplement until they are approximately six months old. If this was discontinued too early, bow-leg syndrome could still occur with enlargement of the joint.

It was also necessary to reduce the food intake in order to slow down early growth and to improve environmental factors. Five zootechnic

measures might follow on the nutritional prophylaxis:

1. At the Paris Zoological Park we gave several meals a day, i.e. one-month old chicks had six daily meals and six-month old chicks had four.
2. The influence of exercise was very important. Chicks should be encouraged to move and walk to develop their leg joints and bones. A chick which did not move, was unstable and fell down often had a higher risk of developing bow legs. A large area was necessary to allow chicks to be always on the move.
3. We have found that a floor covering of jute or straw decreases the risks of slipping and bow legs.
4. During the first weeks, provision of livefood kept the chicks busy and helped to prevent a rapid weight gain.
5. A ratite chick should not be left alone because it will tend to be less active and its legs become fragile. Ratite chicks kept in groups numbering between 10 and 12 young birds of the same species all together was preferable, taking care not to have too great a difference of age between them. Three weeks between the youngest and the oldest in the same group constituted the maximum safe range.

To limit development of bowing during the first critical period, we provided support for the legs from hatching onwards. We put an elastic bandage with a compress between the two legs in the midst of tibiae and, sometimes, tarsometatarsae. Chicks could rest and move without running excessively. One week afterwards, the rubber bandage was taken off. This slack restraining apparatus led to a decrease in the incidence of bow legs syndrome on all three studied species of ratite birds.

Discussion

Our experience has shown that the bow legs syndrome is often an indication of malnutrition. Due to the chicks' inactivity in certain conditions, environmental hazards and inadequate food intake, optimum survival rates are not obtained. With the male-reared chicks, the bow legs syndrome is unknown (Bruning, 1973; Bruning, 1974). Wild birds have to hunt for a varied diet and greater activity results in natural growth without rapid weight increases.

The results indicate that the bow legs syndrome is due essentially to an imbalance in calcium metabolism. Deficiencies of manganese and zinc with heavy supplementation of calcium, probably do not cause this syndrome, but may interfere with the absorption of calcium (Wallach, 1970). The aetiology may be the association between a deficiency of calcium and

a too rapid weight gain. So, an excessive high energy ration can be a contributory factor to the bow legs syndrome (Ullrey, 1982). Therefore, food intake, especially of cereals and pellets, should be reduced to slow down early growth.

Nutrition is not the only cause, however, as bone problems can develop during the first week after hatching when chicks begin eating. Stability of legs is an important point. Legs of chicks that do not move early become fragile and generally become bowed. Activity and movement that strengthen the bones, are also preventative measures.

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INVERTED RESTING IN *PIONUS* PARROTS

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With the exception of Asian Hanging Parrots *Loriculus* sp., which usually rest and sleep upside down (Buckley, 1968), this habit is hardly known in other members of the Psittaciformes. However, inverted resting is more common within this group than suggested in literature.

The neotropical Barred Parrakeet *Bolborhynchus lineola* was first recorded as sleeping upside down by Prestwich (1954). Dilger (1960) observed *Agapornis pullaria* resting and sleeping upside down and sometimes saw *Agapornis taranta* resting this way during the day. The South American Green-rumped Parrotlet *Forpus passerinus* has been observed resting and preening in the same way (Buckley and Buckley, 1968).

During our studies on the neotropical parrot genus *Pionus*, some preliminary results of which have been presented in a previous article (Lantermann, 1983), we observed two further species of parrots resting upside down.

Two young Blue-headed Parrots *Pionus menstruus*, which were bred in our Institute in the summer of 1982, were first seen resting in that position at the age of four months. The parrots chose a perch of about 25 mm in diameter, turned their bodies upside down and hung by both feet after shuffling their feet around to find the most suitable foothold. They have never been observed with one foot tucked under the body feathers and the head turned over the shoulder. Seven months after hatching, these birds stopped hanging upside down and two other young parrots from the same 1982 brood never showed this behaviour pattern.

The Scaly-headed Parrots *Pionus maximiliani*, two of which we keep in our aviaries, sporadically rested in the same way when they were obviously very young birds. This habit stopped after the birds had lived in our Institute for six months but unfortunately we did not know the exact age of the parrots at the time we bought them from a dealer.

According to Dilger's definition (loc. cit.), the behaviour pattern of resting and sleeping includes slightly fluffed body feathers and closed or partly closed eyes, sometimes with the head turned over the shoulder. None of our birds ever showed these characteristics, but the frequency of this way of hanging upside down, which was usually performed several times a day for sometimes more than 30 minutes, makes us believe that this was not play behaviour but a form of resting.

The origin of this habit is not exactly known. Dilger suggests that it

must have evolved in a common ancestor of the paleotropical *Loriculus* and *Agapornis* parrots 'in response to nocturnal predators from which safety was achieved by sleeping amid leaves at the slender ends of twigs' (p. 660).

We assume that this element is a behavioural rudiment without any function for a 'modern' parrot group like the highly developed *Pionus* parrots. Behavioural rudiments are occasionally found in young birds, which perform 'extinct' behaviour patterns and in certain circumstances allow one to draw conclusions on the behaviour and ecological adaptations of their ancestors (Immelmann, 1983).

It is conceivable that the ancestors of Old World parrots (i.e. *Loriculus* and *Agapornis*) and New World parrots (i.e. *Bolborhynchus*, *Forpus* and *Pionus*) independently of each other evolved the same methods of protecting against nocturnal predators. But the relatively heavy weight of *Pionus* parrots (+/- 220 g) is noteworthy and seems to be unsuitable for that way of protecting against predators, suggested by Dilger for the much smaller *Loriculus* (+/- 30 g) and *Agapornis* (+/- 45 g) parrots. It might be supposed that former relations of *Pionus* parrots were of smaller size than recent forms of that group.

For adult *Pionus menstruus* and *P. maximiliani* inverted resting is not recorded in freedom or captivity. We have never seen this behaviour pattern in any other *Pionus* species, some of which we keep in our aviaries.

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NOTES ON CUBAN FINCHES

Tiaris canora

BY BRYAN E. REED

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My partner, Albert Holmes, and I bought two pairs of these birds in 1982 and although we had a relatively poor start in breeding them, this has now been resolved. We are at present working with eight breeding pairs, plus two or three odd cock birds. We have built up our stock from Dutch, German and English strains, using birds as unrelated as possible. Unlike some people, we do not keep compatible pairs together producing great quantities of similar genetic material. We allow pairs to rear one to three rounds, swap them round, rest them for a period and start again. We feel this is essential in order to produce as much unrelated stock for the future of aviculture in this country.

Anyone with any knowledge of these birds will agree that they are a little unpredictable, to say the least. Compatibility is really the key to success, as a compatible pair will produce many young with little or no trouble. However, this is surely not the aim of a genuine aviculturist whose task should be to ensure a strong nucleus of unrelated birds for the future. Therefore, in the long term, one chick reared by a pair which is not completely compatible must be of more use genetically than a dozen produced from a compatible pair. As I say, some birds are no trouble, others will rear one round and lose the next. Some birds will learn by their mistakes and get the chicks a few days older each time until they finally succeed. Some birds will not have your chosen partner at any price! Sometimes, if the cock is removed, the hen will rear the chicks on her own. So you can see that Cuban Finches are unpredictable but nevertheless very interesting.

They can also be quite pugnacious - two breeders with whom I am working have had cocks kill hens. I had a hen kill two cocks, accept my third offering and rear two rounds of four and three young respectively.

Cuban Finches can be bred in flights or cages. In my experience, cages measuring 15 x 15 x 36 in long (0.38 x 0.38 x 0.91 m) are best but this is a personal observation. Chicks can leave the nest at 12/14 days and at this size/age they would probably perish outside in bad weather. I find that flask-type baskets are preferred, and if these are hung at a slight incline, it does help to keep chicks inside a few days longer. The neat nests are lined with feathers stripped from the hen (usually). My birds use hay and coconut fibre for nesting material.

The chicks moult into adult plumage and mature very fast. In fact, it is not unusual to breed from them at three to four months old and I see no reason to discourage them if they are fit and want to reproduce. There is no evidence to suggest that inferior young are produced and, in fact, another breeder has stated that, in his experience, to stop them from breeding at an early age is detrimental and actually gives poorer results.

When the hens are in breeding condition, they have a most peculiar 'musky' odour which will almost 'knock you over' if they are held in the hand. I remove young from their parents at approximately three weeks old. Very occasionally adult cocks will kill young cocks if they are left with their parents until they start to 'colour up'. Young birds sometimes leave the nest plucked, but their feathers soon grow back. One or other of the parents is usually plucked to a varying degree for lining the nest, but the feathers are allowed to grow back once nesting has stopped.

With regard to feeding and general husbandry, all my seedeaters receive similar treatment. The birdroom, which is made of wood, is well insulated and has a large amount of double glazing used in its construction. It is thermostatically controlled at 60°F minimum. Newspaper is used as a floor covering (I once had a friend remark, 'No wonder he breeds so many with all those pinups to look at!'). Canary seed, panicum and mixed millet are fed in separate pots to reduce wastage. Spray millet is always available as are various greenstuffs and seeding weeds in season. Once a week a half handful of the following mixture is thrown on the floor: British wild seed, Haith's Tonic Grains (or a mixture of maw, gold of pleasure, niger, lettuce and rape), yeast, Haith's Mineralised Grit, limestone grit, oystershell grit, grated iodine block, Haith's Pink Minerals, charcoal, Kirkpatrick's Pigeon Minerals, kelp powder and sand. Water is always available, the same container being used for drinking and bathing, (I do not use clip-on water fountains). A small dish of softbill food is provided and changed weekly.

At 7.0 a.m. each pair gets a half teaspoon of dry eggfood. I use an equal mix of 'Ce-De' and 'Ce-De Mix'. Heaped on this dry food I provide approximately one teaspoon of soaked, sprouted seed. I find a salad sprouter is more efficient for sprouting than other methods, and I take equal parts of paddy rice, oats, groats, hemp, and mung beans and mix one cup of this dry seed mixture with one cup of plain canary and one cup of mixed millet. This mixture is soaked and sprouted for approximately three days.

When birds have chicks in the nest, naturally I increase the amount of soaked seed given each morning. I also give them some more soaked seed in the evening, but no more eggfood. Some birds will eat a little wholemeal

bread and milk with soaked seed on top. A slice of pear, or orange sprinkled with sugar, is provided about twice a week. Mealworms, small or cut up, are given when rearing (about four to six), morning and evening. Sometimes bushes are beaten for insects in the summer. A vitamin preparation is occasionally added to the water, usually Vitaflight or Vitality Plus (same product, different name). Occasionally other products are used.

I do not use a vitamin preparation on a regular basis. I may use it twice one week and then miss a week so perhaps it would be fairer to say that I use it as and when I think of it. I do not use vitamin preparations when chicks are less than a week old as I have sometimes found that this results in chicks being ejected.

I hope that this article will encourage others to continue to build up a strain of these birds and other small unusual seedeaters before any future legislation in various countries prevents us from doing so.

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OBSERVATIONS ON THE BICHENO FINCH

Peophila bichenovii

By A.J. MOBBS

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Two races of the Bicheno Finch are recognised (see Blakers, M. et al, 1984, for the most up-to-date distribution details).

P.b. bichenovii has a white rump and is often referred to as the Banded Finch and *P.b. annulosa*, which has a black rump, is given the name Black-ringed Finch. It is reported that where the range between the two races overlaps, not only are there white-rumped and black-rumped specimens but also individuals showing variable amounts of white feathering on an otherwise black rump (Keast, 1958; Mathews, 1926). In captivity, the black-rumped race has proved to be recessive to the white-rumped and when mated together, only white-rumped birds are produced (which are, of course, split for black-rumped).

The black-rumped race is very rare in captivity. There are a certain number about, however, and in October 1985 I purchased a hen from, of all places, the Parrot Society Show at Luton. Two months later, at the National Exhibition of Cage Birds (held at the N.E.C., Birmingham) I saw another on a dealer's stand. Much as I would have liked to purchase this bird, upon inspection it was found to have a severe vent disorder so I left well alone. However, someone did purchase the bird as, about half an hour later, I noticed it was missing from the dealer's cage.

Housing

Although Bichenos can be of a somewhat nervous disposition, they will settle well to cage life and under such conditions can prove extremely prolific. My breeding pairs are housed in box cages measuring 0.91 x 0.41 x 0.41 m. Young and resting adults are housed in cages 1.8 m x 0.41 x 0.41 m, with no more than 10 birds per cage.

Breeding

A nest-box is placed ready in a rear corner of the cage immediately before the breeding pair is introduced. The design I use is a 0.13 m cube with a 0.04 m opening. A hinged lid is fitted, thus making nest inspection a simple matter. To the nest-box is added a layer of clean, white sawdust (or shavings) and the box is then filled with a mixture of coconut fibre and soft hay, after which a hollow is made by placing the ball of one's fist into the material. A small amount of nesting material is placed on the floor

of the cage (under the nest-box so that it does not become soiled with droppings). Rarely do the birds use this extra material, although cock birds will take up pieces of the hay for display purposes (see later).

A breeding pair will usually enter the nest-box almost immediately they are released into the breeding cage. Even those which prove a little shy of the box will most certainly enter for the night period and from then on use it regularly.

Unlike certain species of Australian finch such as the Gouldian *Chloebea gouldiae* (see Mobbs, 1985a), Bichenos do not appear to have a set pattern when breeding. Because of this, I can only describe the average breeding cycle taken from details kept on a number of pairs.

Usually a pair will start to incubate before the final egg of the clutch is laid. Chicks always hatch within a two to three day period of each other, so I presume most pairs do not start to incubate in earnest until at least the second or third egg has been laid. The average clutch is four, and chicks begin to hatch after 12 days. They are minute at first and it is very difficult to discern how many chicks there are in a nest if one takes only a perfunctory glance. Upon hatching the chicks are flesh-coloured and covered in white down. The down is lost and the flesh darkens within three to six days of hatching. At this time the quills of the primaries begin to appear.

When the chicks are seven days old, the parent birds appear, during the day, to brood only spasmodically and by the ninth day, brooding ceases altogether although both parent birds will sleep in the nest-box at night.

Both parents feed the chicks, often entering the nest at the same time. When the chicks are 10 days old, it is possible to close-ring them. One certainly should not attempt to do so before this age and it is often possible to close-ring chicks of up to 13-14 days of age.

Chicks begin to leave the nest from about 28 days. At first they may leave the nest-box for only a matter of minutes, after which they will return. As they become more mature, they will leave the nest for longer periods, but always return to roost.

Chicks can be removed from their parents at approximately six weeks old; left longer, the parent birds are likely to attack them.

With Gouldian Finches, I always remove the nest-box from the breeding cage when the chicks are one month old (Mobbs, 1985a). Bichenos become so attached to their nest-box that to remove it would no doubt cause stress both to the parent birds and the chicks. Indeed, for the first few days after the chicks are moved from the breeding cage to a growing-on cage (see above), they will, in the late evening, search around the cage in obvious distress, until eventually they settle down on a perch to roost. Some breeders supply young birds with a nest-box in which to sleep, but



A.J. Mobbs

Bicheno Finches at four days old



A.J. Mobbs

Bicheno Finches, at 11 days old, ready for close-ringing

I am totally against this practice as not only may it induce young birds to attempt nesting long before they should, it also encourages the birds to remain timid, hiding away in the box whenever anyone enters the bird-room.

The moment the chicks are removed from their parents, the breeding cage should be thoroughly cleaned, the nest-box emptied of its contents, washed, refilled with nesting material and placed into position. It is imperative that this is carried out immediately the chicks are removed as the hen will almost certainly start to lay a further clutch within a matter of days. Indeed, I have known hens lay eggs when the chicks they are rearing are only four weeks old. One pair which did this actually reared the chicks already with them and carried on to successfully hatch the second clutch and rear the chicks to independence.

Bichenos can prove prolific breeders but, as with all the birds that I keep, I only allow each pair to rear two clutches each season. This means that when the breeding season is over and the pairs are split up, the hens always carry on laying eggs for a week or so after being placed in the resting cages. Such eggs should be collected up the moment they are found and either discarded or, if one is not against the use of foster parents, put under Bengalese Finches, as these eggs almost invariably prove fertile.

Growth of chicks

Bichenos, when first they leave the nest are only half the size of an adult. Many have pin feathers on and around the head and the tail feathers are at the most only half grown.

Well-fed chicks have the same feather pattern as an adult but the colours are much subdued, the face mask and the breast band being greyish white, with the black and white markings on the wings much less defined than in an adult bird.

Chicks which have not received a sufficiently nutritious diet often have only the top black breast bar, others may have no breast bars at all, the whole of the upper chest and breast being greyish white. Chicks marked thus always moult out normally, attaining the usual adult plumage with the first moult.

Bichenos begin the first moult into adult plumage at approximately six weeks old and well-fed chicks attain full adult plumage within eight to nine weeks. Although not a particularly vocal species, young cocks often begin to sing at six weeks old.

Because Bichenos attain full adult plumage at a relatively early age, many aviculturists put young birds down to nest far too early. Many hens can be lost because of this, due mainly to egg-binding. Although a young Bicheno appears fully adult at approximately eight weeks old, if

such birds are compared with adult birds of, say, seven months or more it will be noticed that the young birds are usually smaller. I have found that young Bichenos will continue to mature until they are at least six to seven months old. Therefore I never use a Bicheno for breeding purposes until it is at least nine months old.

Many young hens will begin to lay eggs at this age. If they do, it is a good sign that they are ready for breeding.

Adult hens housed in resting cages will begin to lay eggs soon after the annual moult is completed. Indeed many will become so keen to breed that they will lay in the seed bowls and often continue to sit in the bowls after the eggs have been removed. I remember one hen in particular who did this. When eventually I paired her up and placed her in the breeding cage, she laid eggs in the nest-box but when it was the cock's turn to incubate, the hen, after taking food, could be found sitting in the seed pot until it was her turn to incubate again.

Diet

The staple diet supplied to my Bichenos consists of pearl white millet, pannicum millet and plain canary seed. All are supplied in separate dishes. Spray millet is available permanently as is oyster shell, limestone and mineralised grit. A piece of cuttlefish 'bone' is attached to the cage front permanently and flaked cuttlefish 'bone' is given at least three times a week. A dish of soaked seeds (consisting of one part budgerigar mixture to one part plain canary seed) is given daily. Non-breeding birds take only small amounts, but pairs with chicks and young birds take these seeds avidly and are offered as much as they will consume.

Thoroughly washed lettuce is given to breeding pairs three times daily; non-breeding birds and young birds are offered lettuce every other day.

Once or twice a week a teaspoonful of Kilpatrick's Iodised Minerals (for pigeons) is placed on the floor of the cage. This is taken avidly and is eaten so quickly it is not on the cage floor long enough to become soiled with droppings.

No livefood is offered, but pairs with young will take a good proprietary brand of egg food, especially when their chicks are between one to ten days old. When the chicks are weaned, egg food is offered until they complete their first moult. Hen eggshell is also offered about twice a week to both breeding and non-breeding birds. The shells should first be placed in nearly boiling water for approximately three minutes, then left to dry before being offered, or if not required immediately, should be stored in a clean screw-top jar ready for use. As with most Australian finches, Bichenos seem to prefer the egg shell to be offered in large pieces.

Sexing

It is extremely difficult to sex Bichenos by visual means. Cocks supposedly have brighter masks and chest bands than hens, and the black chest bars on the former are supposedly wider. This may prove correct in certain cases, but what does one do when one is confronted with an exceptionally well marked hen or a poorly marked cock?

For the past year I have used the following method of sexing and to date, it has proved the ideal way in which to deal with this problem. To use this method one requires at least two birds and preferably they should have been housed together for at least a couple of weeks. Then, if one considers that they may not be a true pair, remove one to a cage on its own. If either bird is a cock, then within seconds (yes, that is all it will take), the bird will start singing. It is noticeable that a cock bird will, the moment it is caged on its own, stand in an alert position on the perch, hardly moving at all. It may call for a moment or so but will then begin to sing.

If the bird is a hen, it will prove extremely restless, moving from perch to perch continually and although it may call, it obviously will not sing. As mentioned, a cock bird caged on its own will sing almost immediately but to ensure that a non-singing bird is, in fact, a hen, it is prudent to leave the bird caged on its own for at least two or three minutes as, although I have yet to encounter a cock which did not sing within seconds of being placed on its own, to be completely sure that a non-singing bird is a hen, one should at least give it the opportunity to prove otherwise.

So accurate have I found this method of sexing that I can now sex a cage of, say, ten birds within half an hour. It is preferable if the birds that are about to be sexed are in full adult plumage, although I have known young cock birds which were not in full adult plumage, which, when placed on their own, at least attempted to sing.

All my young stock is housed in cages which can be divided down the centre and the birds are easily segregated when one wishes to sex them. Perhaps I should mention that the divider must be solid (mine are made of plywood) as the bird placed on its own must not be able to see others of its kind.

Song and display

Bicheno cocks are not often heard to sing unless caged on their own, out of sight of other Bichenos (see above). Some young cocks from approximately eight weeks old will sing even when in the company of others (of either sex), but as they mature, the song is heard less frequently until eventually many appear never to sing at all.

Some cocks, whilst the hen is incubating, will sing for lengthy periods,

however as soon as the hen appears, these cocks always cease to sing immediately. Overall the species is not vocally inclined and those cocks which appear to be the exception.

The species is certainly active and between rest periods, non-breeding birds are almost always on the move. At such times both sexes will call continually. Morris (1958) describes the two call-notes thus: 'Lost-calling is a plaintive *twoooo-twoooo*, social-calling (is) similar to that of the Zebra Finch *Poephila guttata*.' The 'lost-calling' (or locating call) is loud for such a small bird and when 30-40 Bichenos all give this call in the close confines of a birdroom, the volume of sound can be quite considerable. 'Social-calling' (or contact-call) is much more subdued and as Morris (*loc cit*) mentions, is similar to that of the Zebra Finch but quieter.

I have not witnessed the mating display as described by Morris (*loc cit*) to its full extent. As mentioned in earlier notes on this species (Mobbs, 1985b), I have not witnessed the excessive bill-wiping described by Morris and only occasionally have I witnessed cock birds taking up the courting postures described. Never have I observed a cock bird singing while displaying and from the many birds I have studied, I find it difficult to believe that the song is used during courtship, but believe it is used only for 'advertising'.

For those who do not have access to the paper by Morris, I include, in its entirety, his description of the display of the cock Bicheno: 'The male assumes a courting posture in which the plumage is fully fluffed, so that the body appears spheroid, with no special differential erection of the feathers of the type found in most other species. The bird crouches over the perch, parallel to the female, with his head twisted towards her. In this position he sings and beak-wipes; in order to perform the latter, he does not have to move as far as he would if his courting posture was similar to his more generalised stance. It seems as if the posture is itself part of the beak-wiping; the bird performs the action so many times, that he never, so to speak, quite straightens up again, until after the whole courting phase is over.

'No dance movements were seen in this species ...'.

Since my notes appeared on the grass-carrying sequence (Mobbs, 1985b), I have witnessed other cock birds in my collection carrying out the procedure, so obviously it is part of the display of the Bicheno Finch which may not have been witnessed by others. In the notes, I mentioned that I could find no reference in the literature to this procedure. Since the notes appeared, I have, in fact, located one reference (Rutgers and Norris, 1977), the details of which, although questionable, are quoted here: 'The nuptial dance of the male takes place on the ground; he dances around the female carrying a long blade of grass in his raised beak. He

bows low to her, giving his quiet murmuring song. The male can be recognised by this song.'

The author of the above extract is supposedly referring to the black-rumped race of the Bicheno Finch.

Discussion

Of the two races of Bicheno Finch, only the white-rumped is bred in sufficient numbers for it to be secure in aviculture. Specimens of the black-rumped race are in existence (in aviculture) but numbers appear to be very limited and unless a concerted effort is made to breed from these birds, the race could eventually be lost completely as it is doubtful if wild-caught specimens will ever again be allowed out of Australia. It is possible that there are black-rumped specimens in the possession of bird keepers who do not even know they have what is obviously a rare subspecies. If you keep Bichenos, take a look at their rump colour and if you find you have a black-rumped bird, either attempt to breed from it or release it to someone who will.

The Bicheno can prove extremely prolific and is easily bred in a roomy box-type cage. Sexing can prove difficult but if the method described above is used, the sex of one's birds should easily be determined.

A varied and substantial diet is essential, especially when chicks are being reared; at such times, soaked seeds and egg food will be taken avidly by the parent birds. Failure to supply an adequate diet may result in weak undersized chicks and can also affect the plumage, i.e. lack of the black breast bars.

To date there appears to be no colour mutation in the Bicheno Finch even though fairly substantial numbers are bred each year in Europe.

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THE FOREST CANARY

Serinus scotops

By NEVILLE BRICKELL & ANDREW GREEN

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Alternative names for this species are the Natal Linnet, Striped Canary, Sundevall's Seedeater and Grass Shelly. It is an active bird usually found in pairs or small parties, keeping to the forest canopy and adjacent scrub and exotic vegetation.

The population of the Forest Canary is arranged into three subspecies: the male of the nominate race *S. s. scotops* has the forehead, crown, nape, mantle and back bright olive green, heavily streaked with blackish green; the rump and upper tail-coverts are olive green as is the tail which is edged with black; the stripe over the eye is yellow, the ear-coverts green and chin blackish; greater and lesser wing-coverts are blackish brown, edged with yellow; the throat is yellow; the breast and belly green streaked with blackish green; the under tail-coverts are yellow, the eye brown, the bill horn and the legs and feet brownish. *S. s. umbrosus* is similar to *S. s. scotops* but the upper parts are darker green, the rump olive green streaked with blackish green. *S. s. transvaalensis* is also similar to *S. s. scotops* but the lower throat and breast are darker and the flanks more heavily streaked. The female of the nominate race resembles the male but differs in having the underparts duller and more heavily streaked. Immature birds resemble females but are duller.

The Forest Canary is restricted to South Africa. The nominate race is to be found in the eastern Cape Province, Transkei and Natal (coastal and lower midlands); *S. s. umbrosus* in southern Cape Province (coastal regions), Griqualand East, Natal, western Zululand and south-eastern Transvaal; *S. s. transvaalensis* in the eastern and northern Transvaal (highlands), and probably also western Swaziland.

The song of the male is a brisk warbling, interspersed with trills, being similar to the Cape Canary *Serinus canicollis* but weaker and more high-pitched. Normal call is a low *tsik*.

The Forest Canary feeds on the green seeds of weeds, berries and fruit. It has been recorded eating the leaf petioles of the Sneezewood Tree *Raeroxylon obliquum* and the fruits of *Rubiaceae* (gardenia family). In the aviary they will take readily to a finch mixture (four parts yellow manna, one part red manna, two parts canary and one part white millet) and insects, namely aphids and Black Mound Termite workers. Sweet apple was supplied by Neville Brickell as a substitute for indigenous fruit



Neville Brickell

Male Forest Canary

greenfood in the form of chickweed and thistle must be given at least once a week. Neville Brickell found that they were extremely partial to the ripe seed of the Blackjack *Bidens pilosa* and will always appreciate extras such as Khaki-weed *Alternanthera pungens*, Canary Creeper *Senecio polymoides*, unripe sunflower seed, germinating seed, spray millet and seedling wild grass heads. Andrew Green regularly fed the small yellow seed heads of the Klein Geelbossie *Senecio polyanthemoides* which was relished by the birds. When his birds were nesting Neville Brickell supplied insecticide and egg food daily. A great many aviculturists today use only the proprietary breakfast cereal 'Pro Nutro' as a soft food with excellent results.

This species nests during the summer months, constructing a cup-shaped nest in bushes or small trees, 1-5 m from the ground, in dense cover. Both sexes carry material which consists of moss and various sorts of vegetable down. The cup is lined with stringy lichen. An average clutch comprises two to four, usually three, white to bluish white eggs, spotted with greys and browns, mainly at the thick end. The first recorded breeding in captivity was registered with the society in 1952, followed by a second in 1955 and a third in 1959. No data was made available. Neville Brickell's aviary breeding in 1969 revealed that three eggs were laid. They were incubated solely by the female for a period of 14 days. During incubation the male fed the female, usually on the nest, but also away from the nest when she left to bathe. The young were fed by both parents and remained in the nest for 15 days after which they were not seen for seven days as they had concealed themselves in an adjacent bush. A wicker aviary cup was used as a nest-site which had been thickly lined with stringy pieces of coir. In September 1984 Andrew Green was successful in rearing one chick which was hatched in a naturally built cup nest, situated under cover in the sleeping quarters. In a second attempt, which was unsuccessful, a jam tin was utilised as a nest-site. In 1955 Mr. C.H. Russell produced a hybrid between *Serinus scotops* and *S. mozambicus*.

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NOTES ON THE RED-HEADED FINCH *Amadina erythrocephala* AND THE CUT-THROAT FINCH *A. fasciata*

By NEVILLE BRICKELL
(Avicultural Research Unit, South Africa)

Hall and Moreau (1970) consider these small seed-eating birds of the weaver-finch family as belonging to the mannikin family. The above species form the first of three logical species-groups: the African Silverbill *Lonchura malabarica* and the Pearl-headed Silverbill *L. grisecapilla* form another; the Bronze Mannikin *L. cuculata*, Red-backed Mannikin *L. bicolor* and Pied Mannikin *L. fringilloides* form the third. The Red-headed Finch has been given alternative names such as the Paradise Sparrow, Red-headed Amadina and Red-headed Weaver-Finch and the Cut-Throat Finch has also been called the Cut-throat Weaver, Cut-throat Amadina, Ribbon Finch and Ribbon Weaver-finch.

These are common, highly gregarious species, living in pairs or small flocks but outside the breeding season they gather into large flocks. The typical mannikins favour moist, riparian fringing forests and dense thickets whereas Cut-throats live mostly in dry acacia savanna and disused cultivation. They are very partial to dust bathing in the aviary and in the wild.

The identification of the nominate races has been described by a number of researchers and therefore further comment is not necessary. The race of Red-headed Finch *A.e. dissita* differs from the nominate race in having the head a darker, more crimson red; the white spots on the ventral surface larger and whiter; the black barring and fringing broader; wings and tail darker and greyer. The female's upper parts are darker and greyer, less warm brown; the crown feathers are more purplish, less reddish. The race of Cut-throat Finch *A.f. alexanderi* differs from the nominate race in having broader barring both above and below. *A.f. meridionalis* is similar to *A.f. alexanderi* and has a smaller bill. *A.f. contigua* differs from *A.f. meridionalis* in being warmer and redder brown above; little or no buff on the chin; breast and flanks more washed with russet buff. Females lack the buff chin and red throat band; centre of belly white or cinnamon. Young birds resemble the female, but males have a pale red band across the throat.

The Red-headed Finch ranges from the Cape, Natal, Orange Free State and Transvaal provinces of South Africa, South West Africa, Botswana, western Zimbabwe to Angola. The Cut-throat Finch occurs in north-western Orange Free State, eastern Swaziland, Natal, Zululand, southern Mozambique, Zimbabwe, northern and north-eastern Botswana, northern



Neville Brickell

Male Red-headed Finch

South West Africa and the Caprivi Strip, Malawi, Kenya, eastern Tanzania, Uganda, Somalia, Ethiopia, south-eastern Sudan, northern Nigeria to Senegal.

Cut-throats spend much of their time foraging on the ground feeding mainly on seeds, but some insects are taken, especially flying termites. In the aviary, besides the various kinds of seeds, they must be supplied regularly with insects when nesting, namely mealworms, thrips larvae and nymphs, bristle-tails, spring-tails or fish moths. Little interest may be shown in green food except freshly cut lucerne and grass seedheads. It is advisable to supply softfood such as hard-boiled egg, wholewheat bread or moistened dog biscuit.

Cut-throats do not often build nests of their own, but are perfectly capable of constructing an untidy ball of dry grass with a short tunnel entrance at the side when choosing a tree, shrub or bush, or in a hole in a building, the latter preferred by Red-headed Finches. The nest chamber is lined with feathers, wool and other available soft materials. More often they utilise the nests of other species. The Red-headed Finch is recorded nesting in the deserted nests of the Little Swift *Apus affinis*, Buffalo Weaver *Bubalornis albirostris niger*, Social Weaver *Philetairus socius*, Masked Weaver *Ploceus velatus inustus* and Cape Sparrow *Passer melanurus*. In captivity they are notorious for evicting other birds from their nest chambers, regardless of whether they contain eggs or very young nestlings. There is one record in the wild of a pair of breeding Social Weavers being evicted and the Red-heads laying themselves. The Cut-throat Finch has been recorded robbing the lining from one Buffalo Weaver's nest and taking it into another; also a female repeatedly trying to enter the nest of an incubating weaver. They also commonly use the abandoned nests of species listed above with the addition of the Spotted-backed Weaver *Ploceus cucullatus*, Red-billed Quelea *Quelea quelea* and a record in a woodpecker's hole. In the aviary they may be supplied with standard finch-type nesting boxes containing some nesting material to entice the birds to use them. They will introduce extra material themselves as well as adding more throughout the incubation period. Both birds build, the male carrying and the female arranging it in position. The Red-headed Finch lays 3-8 usually 4-6 white eggs; incubation is shared by both sexes and lasts for 12-14 days. The young are fed by both parents, remaining in the nest for 20-23 days. Unfortunately the Cut-throat Finch is far more prone to egg binding than the Red-heads and it is, therefore, advisable, to encourage the birds to breed during the warmer months. Aviary birds will quite readily breed three times in a season, laying replacement clutches if robbed. Cut-throat Finches lay four to six, nine on record, white eggs - the high figure

might, of course, be due to two females laying in the same nest; both sexes incubate for 12-13 days, the young remain in the nest for 22-24 days. Adult plumage is attained at 70-75 days and they commence breeding at eight to nine months old.

It is reported that captive Red-heads have been taught to talk, though not as well as parrots. The crossing of the Red-headed Finch with the Cut-throat Finch produces male hybrids which are fertile. The Red-headed Finch has also been crossed with the Java Sparrow *Padda oryzivora*, the Cut-throat Finch with Parson Finch *Poephila cincta*, African Silverbill *Euodice cantans*, Indian Silverbill *Euodice malabarica* and Java Sparrow *Padda oryzivora*. The most attractive crossing is the male Cut-throat Finch and a female white Java Sparrow.

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RESULTS OF THE HOODED SISKIN CENSUS

By DAVID COLES
(Cobham, Surrey)

Following concern over the status of the Hooded Siskin *Carduelis cucullata* in its native Venezuela, an attempt at surveying the captive population of this delightful species was undertaken. Although a fairly ambitious project, details of the proposed census were circulated, via four regional collators, to many journals and individuals throughout the world in the hope of obtaining as much publicity as possible for the project.

Problems encountered were many, the most restrictive being the language barrier but despite this, some valuable information has been forthcoming, a summary of which is set out below.

For convenience the data has been divided into two sections:

CAPTIVE STATUS - attempts to summarise the populations for each country from which information was received and is applicable to 1984, data being requested for 1st January 1985; **HUSBANDRY** - attempts to analyse the methods adopted by the various aviculturists who forwarded details.

CAPTIVE STATUS

SOUTH AMERICA

PERU - Information received via Mary Goodwin, would indicate that a captive population does not exist at the moment.

URAGUAY - As for Peru.

VENEZUELA - Replies were received from three breeders, Juan Camacaro, Vincenzo Serino and Domingo Conde, all of whom had kept the species for some considerable time, 30, 20 and 28 years respectively. Breeding has taken place over a number of years with Serino and Conde reporting success covering as many years as kept. Camacaro has been breeding the species for five years. Numbers reared in 1984 were 3, 24 and 26.

At maximum, there are believed to be only one or two other breeders in the country with whom contact was not made.

NORTH AMERICA

Pat Demko reared 19 (11 males, 8 females) in 1984 from eight pairs, all of which were parent-reared. Otherwise little information was forthcoming but it is evident that a fairly substantial population does exist but with the species singled out for research by the Conservation Committee of the American Federation of Aviculture, it is hoped that

more exhaustive data will be available in the near future.

The only return received showed the breeder to have had success from 1976 with between 15 and 36 reared annually. Present breeding stock consists of 10 pairs.

AUSTRALIA

A viable population exists but little information materialised. The Australian Federation of Aviculture is planning a survey of stock within the country which it is hoped will give an insight into the numbers kept and bred.

SOUTH AFRICA

A fragile population in the care of one aviculturist. Fred Barnicoat of Johannesburg, who has five pairs plus three males. In 1984 three of the five pairs laid and two hatched young. Two males only were reared from one pair.

EUROPE

GIBRALTAR. At present being bred by D. Galliano. Five young reared in 1984 proved to be four cocks and one hen from one pair. Total number of birds is now three pairs and two odd males.

NORWAY. Does not seem to be represented. Enquires by H.R. Grastveit to the country's eight bird societies proved negative.

DENMARK. On hearsay, represented in several collections with breeding reported in one. Many letters written but practically no replies.

SWEDEN. Represented in at least one collection, that of U. Magnusson who has several birds.

BRITAIN. Very few birds with a total population of less than a dozen. Most are males in the hands of canary breeders but a pair owned by H. Brierley bred for the first time in 1984, rearing four (3/1).

WEST GERMANY. Details of the census were printed in several magazines but only one reply was obtained, and that from an aviculturist who had just obtained his pair. However, Dr. Joachim Steinbacher, editor of *Die Gefiederte Welt*, states: 'I am now quite sure that we have in Germany many hundreds of successful breeders.'

ITALY. Through the co-operation of the Federazione Ornicoltori Italiani who initially sent a list of 14 keepers/breeders, we were able to obtain the only documented evidence provided by our returns, that the Hooded Siskin is bred in quite substantial numbers, confirming a generalisation made by Bruno Mancini in *Cage and Aviary Birds* (reference unknown).

Of the 14, replies from only three materialised but they do provide an insight into how prolific the species can be with the correct management techniques. One can only surmise that the species is well established in Italy. Their achievements for 1984 are as follows:-

Franco Pontiggia	129 reared from 18 pairs
Giorgio Lattanzi	59 (31/28) reared from 8 pairs
Giovannia Bertolini	124 (68/56) from 12 males mated to 15 females

SPAIN. The only reply was received from Juliana Miralles Vila, via the Federacion Ornitologica Venezolana. Success being achieved for the previous 16 years with the 1984 season yielding 29 independent young from six pairs. Although impossible to ascertain numbers, it would appear from the above success, and various breeding accounts which unfortunately lack numerical data, that its existence is well established in Spain.

BELGIUM. No helpful replies but on hearsay it is believed to be extensively bred.

HOLLAND. As for Belgium.

No replies were received from New Zealand, Japan, Malaya, Singapore, Switzerland, Portugal, Hungary, Austria, East Germany or France. However, in fairness, it must be said that in most cases the language problem and lack of contacts were a considerable barrier. Despite the problems, it is possible to get an idea of how the captive population stands. Unlike the situation in the wild, numbers of the Hooded Siskin in captivity seem to be on an upward trend, even if only in a limited number of countries, and it is more than probable that the number held in captivity exceeds the wild population.

The unsavoury practice of smuggling continues to be a threat to the wild population and it is a situation that must not be condoned, but one cannot help wondering whether the practice could be completely stamped out if the Venezuelan authorities allowed the export of captive-bred, close-rung birds, especially males, of which there seems to be a surplus and for which there is most demand. Captive breeding could also, in time, satisfy a local demand.

In response to our efforts, three Venezueland aviculturists sent in their returns: between them they have 78 years' experience in keeping, and 53 years of breeding the Hooded Siskin, rearing 53 young in 1984. To ignore this depth of experience in an endangered species' homeland, while trying to save it from extinction seems shortsighted indeed.

HUSBANDRY

In addition to the information collection from questionnaire returns, Professor Antonio Rivero has kindly given his permission to quote from his book *El Cardenalito de Venezuela* which was painstakingly translated by Mary Goodwin.

To make the task of compilation simpler and information easier to pinpoint, material is placed under separate headings, roughly along the lines of the questionnaire, but with additional data included where necessary.

History of stock. Where details have been divulged, it seems that most owners obtained their breeding stock from established breeders. Certainly in European countries at least the vast majority of birds, if not all, are now captive-bred.

Identification. Many birds are close-rung, but it appears that in Italy, breeders of the Hooded Siskin (and others?) are registered with the Federazione Ornicoltori Italiani and given their own coded rings. Lattanzi was the only one to give details on rings, his being put on during the sixth day.

Accommodation. The method favoured by ALL breeders was an indoor environment, although Barnicoat did experiment with a completely covered outdoor aviary with some success. Indoor accommodation allows a means of controlling temperature, if necessary, and eliminates problems caused by dramatic changes of climate, and predators.

Cage sizes seemed unimportant as results were not proportionate to space provided. Bertolini bred his birds in cages measuring 60 cm x 30 cm x 30 cm which were presumably of the box type with a wire front. Only Barnicoat and Brierley kept their birds in what could be considered flight cages, and which had a minimum length of 180 cm; both have bred young.

All others housed their birds in presumably box-type cages, the length of which varied between 60 and 80 cm with height and depth roughly half the length size. Only Lattanzi gave extra depth in proportion to length.

Most breeders keep their birds in a quiet, tranquil area to avoid disturbance but Conde never found it necessary and kept his birds in the kitchen, with all the accompanying noise and '...my birds still reproduce in a most healthy manner'.

The subject of artificial light is only mentioned by Pontiggia who extends day length by about half an hour before dawn, starting at the beginning of March to arrive at a maximum of an hour by the end of April. This regime is kept up until the end of July.

Where heat is controlled, a range between 15-21°C seems to be preferred but several breeders allow it to drop much lower. Although fit birds seem able to cope, as Pontiggia notes, health problems may be encountered, particularly in elderly birds.

Diet. Perhaps the most important aspect of husbandry and one on which several authors give very detailed information. Pontiggia, who goes into it very thoroughly, gives the following:

- ½ Niger
- ½ Wild Chicory *Cichorium intybus*)
- Huds *Dispacus silvester*) in equal parts
- Hemp *Cannabis sativa*)

Lettuce leaves and/or slices of apple are given daily, as are two spoons of husked sunflower seed. Grit, very fine sand and cuttlefish 'bone' are also given.

During the breeding season (March to August) the following seeding weeds are added to the previous diet:

Oats	<i>Avena sativa</i>	June/July
Shepherd's Purse	<i>Capsella bursa-pastoris</i>	April/May
Chickweed	<i>Stellaria media</i>	Feb/March/April/May
Wild Chicory	<i>Cichorium intybus</i>	Aug/Sept/Oct
Couch Grass	<i>Agropyron repans</i>	June/July/Aug/Sept.
Hedge Mustard	<i>Siymbrium officinale</i>	June/July/Aug/Sept.
Bermuda Grass	<i>Cynadon doctylon</i>	April/May/June/July
Smooth Meadow Grass	<i>Poa pratensis</i>	April/May/June
Patience Dock	<i>Rumex patientia</i>	June/July
Greater Plantain	<i>Plantago major</i>	June/July/Aug
Groundsel	<i>Senecio vulgaris</i>	April/May/June
Dandelion	<i>Taraxacum officinale</i>	March/April/May/June

Besides the above, the following unripe ears are also fed:

Maize	<i>Zea mays</i>	July/Aug/Sept
Small Sunflower	<i>Halianthus annus</i>	Aug/Sept/Oct
Italian Millet	<i>Setaria italica</i>	June/July/Aug
Common Millet	<i>Panicum miliacum</i>	June/July/Aug

Finally, three times a week, a soft food is given, made as follows:

- 1 glass of wheat semolina
- 1 glass of milk powder (as for calves) mixed with water

This is cooked for 10 minutes adding three egg yolks and albumen before boiling point is reached.

All give additional food during the breeding season, several provide it just prior, as the birds approach breeding condition. Rivero suggests a mixture of 65% bird seed, 10% rape, 10% niger and 5% each of turnip seed, linseed and hemp. Conde feeds a mixture of one pound of rape, one pound of oats and half a pound each of hemp and wheat germ, blended in a liquidiser. Brierley gives a quarter of a teaspoon of a mixture of linseed, hemp, teazle and a few groats, half a teaspoon of niger and rape *ad lib*.

The provision of a soft food is practised by most, although Brierley states that although his young were reared by canaries, they would not touch egg food. Several formulae are given below:

Serine: 2 litres of milk mixed with 1 kilo of cornmeal and two eggs.

Vila: A paste with a base of breadcrumbs, soya flour and some seeds such as niger and rape. Additional to this, Vitamin E, calcium and Terramycin (oxytetracycline - an antibiotic) are included in the breeding season. Extra water is added, if necessary to ensure the mixture is not compacted.

Other items offered during breeding are: hard-boiled egg, chickweed, lettuce (of which they seem to be extremely fond), watercress, dandelion, green pepper, apple plus the usual cuttlefish 'bone' and mineralised grit. Only Rivera mentions livefood - '..... small portions of insects, such as mealworms, are indispensable'.

Out of the breeding season, many feed 'standard' canary mixture, plus greenfood and fruit. Lattanzi, however, feeds a mixture of six parts plain canary, four parts niger, one part small hemp, one part linseed and half a part each of teazle, chicory and lettuce seed.

Nest Receptacle. The most favoured receptacle seems to be a 'typical' canary nest pan but the material from which this is made seems to differ from country to country and is either of plastic, wood or wicker. Only Pontiggia mentions the use of half open-fronted boxes; these he placed high up, three to a cage.

Nesting material. The type used for canaries seems to be the most favoured but moss, fine dried grass, plumber's hemp and horsehair are also offered. Serino offers 'strings of jute which is usually enough to bring females into breeding condition'.

Nest Construction. Carried out mainly by the female but behaviour is variable with some males assisting.

Pairing. Rivero reports males to be polygamous and very active sexually, both in the wild and in captivity. Most breeders keep their birds in pairs but Pontiggia had one 'very restless' male which he used to introduce to a female when about to lay. In this way, he could get four hens to lay almost together. Bertolini reports using 12 males with 15 breeding females.

Clutch Size. Ranges from three to five whitish eggs. Approximate size 15.8 mm by 12.2 mm (Rivero).

Number of Broods. Rivero gives the number of broods in the wild as one or two. Captive pairs can have as many as four but three seems to be the most usual for prolific pairs in an average breeding season of about five months. Less prolific pairs may only have one or two. Generally it seems that pairs kept as canaries are the most prolific in terms of broods, and consequently numbers, reared.

Incubation. By female alone and lasts from 12-14 days.

Fertility. Only two breeders give statistics. Bertolini says 'in the region of 80%' while Pontiggia gives 'hatch percentage' as 85-95%. However, where fertile eggs have been laid with others, percentage hatching seems to have been very good. At present there seems little degeneration of stock. Bertolini gives dead-in-shell as 3% but this must surely be an acceptable level.

Progress of Chicks from Hatching. (Rivero) 'Young are born with dark reddish skin, covered with fine grey down. For the first three to five days, only the female feeds the young but after approximately the fifth day the male helps with the feeding. When the male brings food to the young, he gives a soft "call". The young, recognising this call, immediately raise their heads and open their beaks to be fed. After the sixth day, the young give small chirps or peeps in a tone that seems to be characteristic of the species of the genus *Carduelis*.

'It is the female that cleans the nest from the first to approximately the seventh or eighth day. After each feeding, the young face the centre of the nest, depositing small faecal sacs on the edge of the nest. These are picked up by the female and thrown out. From about the eighth day the young have grown sufficiently to expel the faecal sacs over the edge of the nest'.

Some breeders found males to be excitable and removed them when young were in the nest. Their eyes open at six days old and they fledge at about 15 days, although Barnicoat gives 21 days for his birds.

Independence. This is achieved in 32-40 days but, as with most birds, the young may continue to be fed for a time afterwards.

Sex Ratio of Young. Bias seems to favour males, with all except Pontiggia having bred a surplus. However, in his return he states: 'After many years of breeding, I have noticed that the youngsters are more hens than males, approximately one male to three hens'.

Hand-rearing. Pat Demko was the only breeder to report hand-rearing, and then only if necessary. In such cases she used Abba 92 nestling food, finely sifted, adding hot water and a little hard-boiled egg yolk. A split plastic band expander was used to feed with. Babies being hand-fed are kept in a hospital cage at 90°F if unfeathered, gradually lowering the temperature as they feather.

Fostering. Three breeders, Serino, Brierley and Barnicoat, use fosters for both incubation and rearing while others have potential foster parents on hand in case the need arises. Canaries are the most favoured, but Pontiggia has also used Redpolls, siskins and, in 1983, even a rosefinch hen. Conde likewise fostered when necessary and found Andean Siskins *Carduelis spinescens* the best mothers and Yellow-bellied Siskins *C. xanthogastra* the best fathers. Pontiggia remarks on the subject, 'In my opinion, the true mother gives the chicks all the antibodies they need to grow perfectly, therefore I try, if at all possible, to parent-rear and to keep in the youngsters the feeding instinct'.

Hybrids. The crossing of male siskins with the canary to obtain the much sought-after 'red factor' is well known but other hybrids are on record. Rivero believes that hybrids with the Andean Siskin occur naturally where the ranges overlap. This cross has also been achieved by Serino while Pontiggia in Italy crossed it with Goldfinch, Redpoll, Mexican Rosefinch and Siskin, presumably using the Hooded Siskin as male parent. A male from the Redpoll cross proved fertile when mated back to a female Redpoll.

Longevity. On average Pontiggia gives a five or six year life span and is of the opinion that a diet of canary, pannicum and sunflower seeds give the longest life. A ten-year old male, still very fertile, is cited by Bertolini. An eight-year old hen is still in the collection of Pat Demko.

Ailments. Rivero devotes a whole chapter to the subject but most of the illnesses mentioned seem to occur in newly caught specimens and for

the most part must be attributed to capture stress and resultant problems.

Only two returns touched on the subject of health: Pontiggia, with his usual thoroughness, reports, 'Deaths usually happen, as with most birds, in the very delicate period of the moult. It is well known that for specimens not in good condition it is difficult to pass this vital period. A bad and long moult is a symptom of not very good general condition and therefore I do not use these specimens for future reproduction. It is generally three to four year old birds that find the moult a trial.

'It can also happen that some youngsters show abdominal swelling. Any birds showing symptoms are isolated and given only canary seed and lettuce. I think that it is possibly caused by an excessive preference for oily seed, in particular niger and sunflower. Normally in this way, after about 20 days, specimens come back to normality. However, they are kept under examination and if possible not used for breeding.

'Some deaths in winter are due to difficulty with respiration (usually in old birds). I think this is due to a cold temperature of 2-3°C and also to sudden changes in temperature. In these cases, I try to intervene, bringing it up to about 10-11°C.

'However, I consider losses of 9-10% normal and therefore do not give medicines'.

Rivero cites 'abdominal inflammation' as a cause of death, giving it as 'the most common and typical illness of Red Siskins', but gives no solution other than antibiotics.

Vila relates that deaths are attributed to no specific illness and that they generally appear to be stronger than canaries. Lack of notes by others would suggest a relatively trouble-free species, if managed properly.

Precautionary Treatments. Only Pontiggia mentions giving a preventative prior to the breeding season. At about the end of February/early March, a two-week course of Bimixim antibiotic is given and to avoid the use of anti-acari insecticide powder, Tabar stripe insecticide is used in the birdroom, changed on average once a month.

ACKNOWLEDGEMENTS

An undertaking such as this involves the work of a great many people, many of whom have gone unnamed. To these and all aviculturists who took the trouble to return questionnaires, gratitude is extended for all your assistance. On a personal footing, I would like to thank the three regional collators, Steven Amos, Mary Goodwin and Bryan Reed, whose enthusiasm made the census possible and whose hard work is, I hope, amply rewarded with the publication of this report.

VISIT TO CHESTNUT LODGE, COBHAM, SURREY

On 1st June 1986, members and their guests were again welcomed by Miss Ruth Ezra and Mr. Raymond Sawyer, in the beautiful grounds of Chestnut Lodge. The weather was overcast, but remained dry and warm as Raymond escorted us around the superbly landscaped gardens and aviaries.

The wide spectrum of bird families represented ensures that there is interest for everyone, however specialised their avicultural tastes. The species breeding included Violet Touracos for the third year, Stella Lory and Satyr Tragopans. A delightful pair of White-breasted Rail was escorting a brood of chicks, three pairs of Avocets were incubating as well as Black-winged Stilts.

In the range of garden aviaries, hopes were high to repeat previous successes with Rothschild's Myna, Emerald and Amethyst Starlings. A pair of Double-toothed Barbets in immaculate condition was much admired, and another interesting and unusual species to be seen was the Kea, young having been bred in 1984 and 1985. The variety of species extended from a Cock-of-the-Rock to sunbirds, Mot-mots, Long-tailed Sibilias and Malayan Crested Jays. A pair of Golden Heart Doves was incubating, Stanley and Demoiselle Cranes had eggs and the Brent Geese had produced their annual six goslings. They parade by the pool they share with a magnificent flock of flamingos.

Jeffrey Trollope

Once again we are deeply grateful to Miss Ezra, our President, and to Raymond Sawyer, for inviting members to what has become our most popular social event. As always the gardens were looking immaculate and with each year, the landscaping becomes even more attractive as shrubs, trees and herbaceous borders mature. After our tour round the birds, during which members saw much to admire and photograph, Miss Ezra entertained us to a most delicious and lavish tea. Members enjoyed the opportunity to sit on in the garden talking and it was very pleasant to meet some new members and members who had travelled great distances to be with us, the furthest coming from Scotland. Even the weather was kind to us and the rain that had threatened all the afternoon, did not start to fall until the last guest was leaving. Miss Ezra most generously donated the proceeds from the ticket sales to our funds and the total raised, including donations, was £148 for which we are particularly grateful as the Society's finances are always in a parlous state. Our thanks again to Miss Ezra and Mr. Sawyer for their generous and interested support.

Hon. Secretary

LONDON ZOO - 1985

By PETER OLNEY

Curator of Birds

1985 was in many ways a difficult year and this was reflected in a reduction in number of species and individuals bred compared with previous years. There was considerable disturbance in the Zoo during the breeding season because of demolitions and other essential work. This caused some necessary moving of birds within the collection, and indeed out of the collection. Disturbance and movements, coupled with an unusually long, cold spring with its relatively short days and low temperatures, produced an overall reduction in breeding.

However, among the 149 individuals and 35 species successfully bred, there were some of particular interest and value. Perhaps the most significant was the hand-rearing of three Congo Peafowl. This shy, ground-haunting pheasant which occurs in the rainforests of eastern Zaire is a close relative of the Asiatic Peafowl, and is the only true pheasant in Africa. Most remarkably, it was not discovered until 1936 when J.P. Chapin found two mounted specimens in the Congo Museum in Tervueren, Belgium. They had been wrongly identified as the Blue Peafowl and were assumed to be birds escaped from captivity, but Chapin realised that they were a species new to science for which he, on the evidence of one feather, had been searching for 23 years.

At present there are only 60-70 of these birds in 12 zoos and collections, and ours are the only ones on public display in Britain. All Congo Peafowl in captivity belong to Antwerp Zoo who, as part of a co-operative breeding programme, generously lent birds to a number of selected zoos and collections. The parents of the three bred here arrived in November 1984, and had laid their first clutch by May 1985. As the birds will re-lay, eggs were taken away and artificially incubated. Four hatched, and three were successfully reared. The incubation period was 28, 27, 27 and 30 days. The last egg was in a different incubator and the 30 days' incubation period may be abnormal - the chick had to be assisted out of the egg and was never a strong bird, eventually dying after 29 days.

Other noteworthy breeding successes included the artificial incubation and hand-rearing of eight Black-footed Penguins (our best year yet), two Humboldt's Penguins, two Crowned Cranes, 17 Indian Grey Francolins, a Stone Curlew, four Puna Teal, and a Goosander.

Parent-reared birds included Sacred Ibis, Abdim's Stork, Chilean Flamingos, Hawaiian Geese, Eider Duck, Perfect Lorikeets, Eclectus

Parrot, Splendid Grass Parrakeets, Rock Peplars, a Barraband Parrakeet, and seven species (including subspecies) of owl.

Species brought into the collection included Chilean Tinamou, Crested Wood Partridges, a male White-faced Scops Owl, a Rusty-barred Owl, a male Hyacinthine Macaw, White-crested Laughing Thrushes, a pair of Asian Pied Starlings, a Javan Hill Mynah, and a pair of Pileated Jays. An attractive collection of foreign finches was also generously presented.

* * *

REVIEWS

There has been a good crop recently of books dealing with particular groups of what I can only describe as water birds, though I think there must be a better definition, and most of them are from the publishing house of Croom Helm who continue to produce books of a very high standard at what are reasonable prices today.

SEABIRDS: An Identification Guide

Text and illustrations by Peter Harrison. Croom Helm (first published 1983, revised edition 1985). ISBN 0-7099-3787-3. Price: £19.95. 448 pages. 88 colour plates. 324 distribution maps; line drawings.

This book is a wonderful example of what one-track mindedness can achieve. Peter Harrison has been interested in seabirds for over 20 years and has been planning this comprehensive guide for almost as long. In 1973 he set out on a seven-year expedition to gather material, visiting all the major seabird areas of the world, and spent several years as a deckhand aboard trawlers and crayfishing boats where seabirds could be more easily studied and sketched.

The result is a very impressive and important book which has already become the standard work on seabirds. The original edition won the Best Bird Book of the Year award in 1983 and this revised edition includes much new information.

The 88 coloured plates depict almost 300 species and nearly every major colour and plumage phase is shown in the 1600 paintings. Of necessity the plates are rather crowded, averaging 20 and in some nearly 30

drawings. One can see that to have allowed more space would have greatly increased the number of colour plates and therefore the price and, in fact, one's eye soon gets used to selecting a particular bird from the rest on the page.

The families covered comprise: Penguins, Divers/Loons, Grebes, Albatrosses, Petrels and Shearwaters, Storm-petrels, Diving-petrels, Tropicbirds, Pelicans, Gannets and Boobies, Cormorants, Frigatebirds, Phalaropes, Sheathbills, Skuas, Gulls, Terns and Noddies, Skimmers, Auks and Sea-ducks. Each species is described in detail and has a two-colour distribution map indicating breeding, non-breeding and migratory distribution. There is a very comprehensive bibliography..

As Roger Tory Peterson sums up in his introduction to this work: 'It is doubtful whether any other ornithologist or birder can match the number of seabirds that Harrison has actually seen in life. Of the approximate 312 species, he has had field experience with all but 30. We salute him for his industry and artistry in producing this book which will give us much information and pleasure.'

This masterly and attractively produced summary of such a diverse and often elusive group cannot be too highly recommended.

OCEAN BIRDS: Their Breeding, Biology and Behaviour

by Lars Lofgren. Croom Helm (originally published in Sweden). ISBN 0-7099-1675-2. Price £16.95. 240 pages. 200 colour photographs; four watercolour paintings; numerous line drawings.

Another very attractive book from the same stable, this does not set out to be a field guide, as the previous book, but rather a summary of our knowledge of this great group of birds. The author, who is a founding member of the Center for the Study of Whales and Dolphins, has combined his extensive field observations (which include ten years in the merchant navy) with a deep concern for the environmental problems and an awareness of the latest discoveries in the study of ocean birds. The interesting and very readable text is grouped under the following chapter headings: Evolution and classification; Properties of Ocean Birds; Seabird Species; Seabird Migration; Seabird Ecology; Seabird Behaviour; Seabird Reproduction; Ocean Birds and Mankind.

The accompanying photographs are quite outstanding.

Still at sea -

THE ATLANTIC ALCIDAE: The Evolution, Distribution and Biology of the Auks Inhabiting the Atlantic Ocean and Adjacent Water Areas

Edited by David N. Nettleship and Tim R. Birkhead. Academic Press. Price: hard-cover £33.50 (ISBN 0.12.515670.7); paperback £17.00 (ISBN 0.12.515671.5).

The auks, or Alcidae (Great Auk, Razorbill, Dovekie, Common and Thick-billed Murre, Black Guillemot and Atlantic Puffin), comprise one of the most specialised but also extremely diverse groups of seabirds, exhibiting a fascinating range of form and ecological adaptations. Moreover they are the seabirds most vulnerable to man's activities, especially oil pollution, and hence are of great concern to conservationists. The last 10-15 years have seen an enormous amount of work on the auks, including a number of long-term field studies. This book summarises for the first time the information gained on breeding biology, population ecology, evolution and conservation of this group. As the authors point out, as well as being interesting in their own right, the auks have proved useful as model species with which to explore many themes and problems in ecology and evolution.

Back to *terra firma*, more or less -

SHOREBIRDS: An Identification Guide to the Waders of the World

By Peter Hayman, John Marchant and Tony Prater. Croom Helm. 416 pages, 88 colour plates, distribution maps and line drawings. ISBN 0-7099-2034-2. Price: £19.95.

We are told that birdwatching is now one of the most popular leisure activities in Britain, over one million people being estimated to be involved. Very large numbers also watch birds in North America and western Europe and substantial numbers elsewhere in the world. Wetlands are a major habitat to which birdwatchers are drawn because a greater variety and number of birds congregate there and of these waders form a substantial number of species present. This group of birds is probably more international than any other, for many waders undertake enormous migrations and vagrants can occur almost anywhere in the world. It is, therefore, one of the most confusing groups of birds and there has long been a need for a really comprehensive identification guide. This book has been produced in the same format as Peter Harrison's *Seabirds: An Identification Guide* (reviewed above) and as there is some overlap in the species, the two books together cover all the Charadriiformes. Herons, cranes and ibises are not included.

The text by John Marchant and Tony Prater is thorough and well-researched, and four-colour maps clearly show breeding and non-breeding distribution areas. Over 1800 paintings are included in the 88 colour plates

by Peter Hayman and whilst overcrowding could again be a criticism, the additional identification information that accompanies each plate is invaluable and by using this book, wader watchers will not only be able to identify species easily, but also the birds' sex, age and racial origin. There are also many attractive line drawings.

In its scope and detail this book is unique, tremendous value for money and again, like its companion volume, highly recommended. I just wish that the publishers had put a weather-proof cover on both volumes since they will obviously spend most of their lives in and out of bird watchers' pockets.

THE HERONS HANDBOOK

By James Hancock and James Kushlan. Croom Helm. ISBN 0-7099-3716-4. Price £16.95. 288 pages. 65 colour plates painted by Robert Gillmor and Peter Hayman; 21 line drawings; 61 distribution maps.

This is based on *The Herons of the World*, published in 1978, but the text has been completely revised and enlarged and there are four extra plates. It has been produced in a more popular, less expensive form (its predecessor cost £46.00 eight years ago!) without loss of quality.

The book is worth buying just for the coloured plates, one of each species, which are outstanding and a feast for Robert Gillmor's many admirers, and Peter Hayman's work here too is excellent. The four plates extra to the original are by Robert Gillmor and depict 60 white herons and egrets of 11 species, showing subspecies, seasonal plumages and bare-parts coloration, which it is hoped may help to sort out the problems of identifying white birds in the field.

The 60 species of herons, egrets and bitterns that make up the family Ardeidae are represented on every continent and many quite closely related and similar-looking species are spread throughout the world. *The Herons Handbook* will be an invaluable aid to identification as well as summarising all that is currently known about this elegant and interesting group.

As well as general chapters on classification, courtship, feeding and identification, each species is described in detail under the headings of identification, distribution and population (with a map showing range), migration, habitat, behaviour, nest, eggs and young, and there is a superb bibliography which must be the most comprehensive ever prepared on this family.

This is a really excellent and superbly illustrated book, and amazing value for money.

CRANES OF THE WORLD

By Paul Johnsgard. Croom Helm. ISBN 0-7099-1425-3. Price £25.00. 23 colour photographs; 24 black and white photographs; numerous line drawings.

Continuing the theme of wetland birds, *Cranes of the World* is a most comprehensive survey of our latest knowledge of the 14 living species of crane. General chapters describe Classification and Evolution, Individualistic and Social Behaviour, Vocalisations, Ecology and Population Dynamics, Comparative Reproductive Biology, Avicultura and Hybridisations, Endangered Species and Conservation, Cranes in Myth and Legend, Origins of Scientific and Vernacular Names, and a Key to the Species and Subspecies. The information given on individual species is very full and really must contain everything that anyone would need to know about each crane. The many line drawings that illustrate the book, including the individual species accounts, are very delicate and most attractive - I assume the artist is the author but cannot find any attribution. The bibliography contains more than 400 references to articles and books about cranes and it was gratifying to find a liberal sprinkling from the *Avicultural Magazine*.

Any publication that increases the sum of our knowledge of these curious, beautiful and awe-inspiring birds can only help to ensure their survival which at the moment is extremely precarious. The International Crane Foundation, based in Baraboo, Wisconsin, USA, has quite rightly endorsed this book.

RIVER BIRDS: Bird Life from Mountain Stream to Estuary.

By Roger Lovegrove and Philip Snow. Columbus Books. ISBN 0-86287-093-3. £10.95; 128 pages; 48 watercolour and 60 line drawings.

This is a completely different book from any of the previous works reviewed here, being a part-lyrical, but factual account of the progress of the River Severn from source to sea, describing the birdlife encountered in the many different habitats along its length. The many scenes are brought to life through the very skilful illustrations. It is an ingenious idea, attractively realised by an harmonious partnership of author Roger Lovegrove, who is RSPB officer for Wales and a regular contributor to radio and television, and young artist Philip Snow whose work has already become well-known through successful exhibitions.

This book would make a most welcome gift for anyone the least bit 'birdy'.

Major Work in German

Those able to read German will find a feast of valuable information in the long-awaited *Lexikon der Vogelhaltung*. Its 678 pages are packed with hundreds of excellent coloured photographs and line drawings of a large proportion of the birds likely to be found in aviculture.

Arranged in dictionary form, as the title suggests, the entries cover dozens of genera with details of representative forms; for example, that for *Amazona* Parrots covers eight pages with four coloured photographs and one line drawing. Avicultural information is not confined to Germany but covers many other countries, including the U.K.

There are also entries for aviculturists and ornithologists, alive and dead, also for general subjects such as feather-plucking. Forty-eight specialists contributed to the *Lexikon*; most are German writers, exceptions being Dr. George Archibald, Otto Bernasek, Dr. R. Burkard and Rosemary Low.

Produced in East Germany and edited by Dr. Franz Robiller, this authoritative and absorbing work costs 98 marks, plus postage, or 40 US dollars, from Buchexport der DDR, VE Aussenhandelsbetrieb, Leninstrasse 16, Leipzig, DDR 7010.

It is hoped to find an English publisher so that the vast amount of knowledge accumulated within its pages will have a wider readership.

R.L.

NEWS AND VIEWS

Malcolm Ellis, who has a special interest in African birds, writes:

Many members must have wondered who was Fischer! It must be doubtful that there are any members who are unfamiliar with Fischer's Lovebird and Fischer's Whydah is quite well-known among aviculturists. Less well-known are Fischer's Touraco, Fischer's Greenbul, Fischer's Starling and Fischer's Sparrow Lark.

All of these bear the name of their discoverer Gustav Adolf Fischer. Born in Barmen, in March 1848, Fischer studied medicine and natural sciences at the Universities of Bonn, Berlin and Wurzburg, joined the medical corps of the German Army and in 1876 obtained indefinite leave to devote himself to African exploration.

Fischer made several expeditions in East Africa and collected on the island of Zanzibar, where for four years he worked as a medical practitioner. Fischer was the first white man to reach Lake Naivasha, in what is now Kenya, and wrote that flocks of Egyptian Geese, about 50 strong, were commonly met with on the marshy shores and described hearing the loud joyous call of the Fish Eagle. Young Maasai warriors prevented that expedition continuing northwards and on the return journey to the coast, Fischer found Lake Natron where he saw Black Terns (there seems to be no modern record of Black Terns occurring at Lake Natron), herons, flamingos and pelicans, and he collected the first specimens of the Chestnut-banded Sand Plover.

Of the birds collected during that expedition, 36 species were described as new and Reichenow named several of them after Fischer. Fischer's Lovebird was described first from Ussure, in what is now Tanzania. Although it does not bear his name, the Golden-winged Sunbird is another of Fischer's discoveries.

Fischer died 11th November 1886, shortly after returning from another expedition to Africa.

Opened in 1969 as a game-viewing lodge, Ngulia Lodge in Tsavo West National Park, Kenya, has become unique in Africa as a site for the study of the spectacular southward passage of northern migrants. It was the game-viewing lights at Ngulia which first revealed that this lodge is on the route used by vast numbers of southbound migrants.

On misty nights, between late October and January, when the moon has yet to rise or has already set, the lights of this lodge attract down thousands of migrants and these settle on trees, on and in the buildings, the garden and sometimes even carpet the ground itself.

By 1981, 52,000 Palaearctic migrants had been ringed at Ngulia. Almost 82% comprised Marsh Warblers, Whitethroats and Sprossers (Thrush Nightingales). Others had included Little Bitterns, an Eleonora's Falcon, Corncrakes, Eurasian Nightjars, Rufous Bush Chats, Iranias (White-throated Robins), Nightingales, River Warblers, Spotted Flycatchers and Red-backed Shrikes.

In the East Africa Natural History Society's Bulletin (November/December, 1985), a correspondent reported how, at dusk on 20th November, a ringer arrived to join the ringing group at Ngulia, having just seen a flock of up to 400 Eastern Red-footed Falcons going to roost on trees along a nearby road.

The following day a flock of several hundred, with many European Rollers, was watched hawking insects, possibly termites. The next day several parties of eagles, mainly Lesser Spotted with a few Steppe Eagles among them, were observed feeding on termites as these emerged from their holes. Twenty-nine eagles were counted in one group and the total was probably near 40.

Who holds the world record for the most bird species seen in a single day? In 'News and Views' (Vol. 90, No. 4), Malcolm Ellis reported that three ornithologists had claimed this record for Kenya, with their tally of 290 species seen there in one day. This claim was challenged by Gregory S. Toffic in this column (Vol. 91, No. 3), who stated that this record belongs to Ted Parker and Scott Robinson, who identified 331 species in a day's birding at the Cocha Cashu Biological Station in south-eastern Peru.

Malcolm Ellis has relayed this information to Terry Stevenson in Kenya in the hope that either he or Don Turner will respond to this challenge to their claim. One which they bettered later in a sponsored count for charity; on that occasion a team led by Terry Stevenson counted 308 species, but failed to check in on time and the first team to reach Nairobi's famous Norfolk Hotel, the team led by Don Turner, logged 304 species.

* * *

The Second International Symposium on Breeding Birds in Captivity, honouring the late Dr. Jean Delacour, will be held from 11th-15th February, 1987, at the Sheraton Premiere, Universal City, California, USA. For further information, members should contact the Symposium Co-ordinator, International Foundation for the Conservation of Birds, 11300 Weddington Street, North Hollywood, California 91601 (Tel. 818. 980-9818).

The following undertake binding of the volumes of the Avicultural Magazine:

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Hon. Secretary

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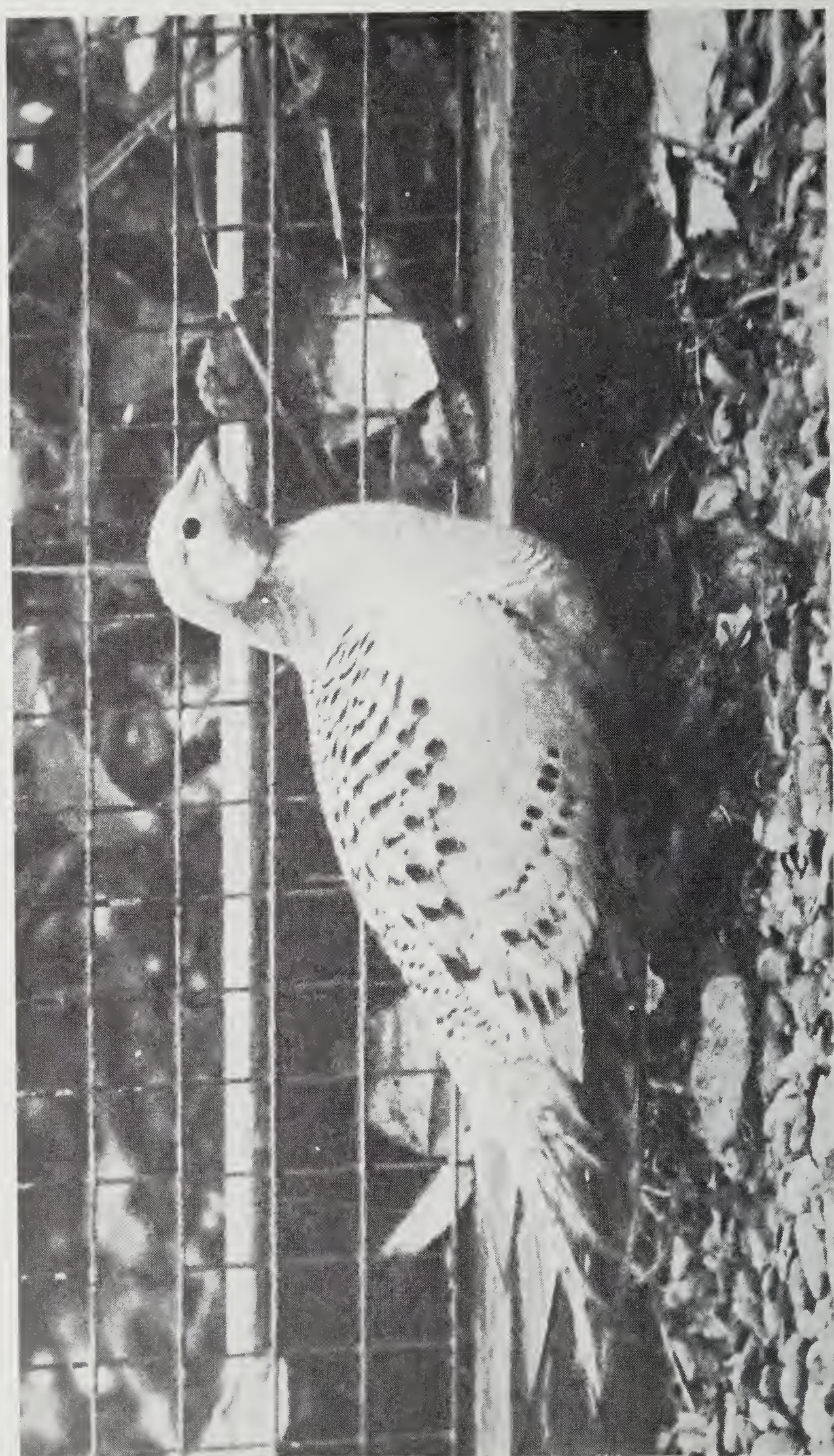
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BREEDING PALLAS'S SANDGROUSE

Syrrhaptes paradoxus
AT CHESTER ZOO

By ROGER WILKINSON (Curator of Birds)
and NICK MANNING (Senior Keeper)

In an article in the Avicultural Magazine in 1929, David Seth-Smith described the Sandgrouse thus: 'The Sandgrouse (Pteroclididae), form a very distinct family of game-birds, showing certain affinities to the Pigeons. They are purely terrestrial, possessing very short legs and long jointed wings, and inhabiting desert countries where they feed upon the seeds of various grasses and other plants. Their plumage is mostly of a sandy or buff colour, harmonizing with the surroundings in which they occur. The tarsi and, in some cases, the toes also, are feathered. They are mostly migratory and their flight is extremely rapid and powerful. They nest on the ground, the nest consisting as a rule of a mere scrape in the sand, and the eggs, three to a clutch, are smooth and glossy, rounded at both ends, with brownish surface spots overlying pale purplish markings beneath the surface of the shell. Both sexes undertake the duties of incubation, the female sitting by day and the male at night, and the young, which are covered with down and beautifully marked, are reared on small seeds.

'Pallas's Sandgrouse is one of two species distinguished by the absence of a hind toe. It occurs in Central Asia and is subject, for some unknown reason to occasional migrations to Western Europe such as occurred in 1863 and again in 1888 when great numbers spread over Europe and reached the western coasts of the British Isles.

'The plumage of the male is sandy with rusty-red throat, a white band flecked with black across the breast, and a large black patch on the abdomen. The female has the sides of the neck spotted with black, a black line below the reddish-buff throat, and no band across the breast.'

In April 1985 Chester Zoo received five Pallas's Sandgrouse from Rotterdam Zoo, Holland. Although imported as unsexed birds it was evident soon after arrival that these were four males and one female. Following quarantine, these were housed in an outside aviary 4.5 x 4.5 x 2.2 m shared with a pair of Maroon-tailed Conures *Pyrrhura melanura*. The birds were provided with a diet of large millet, wheat, poultry breeder/grower pellets, insectivorous mixture, finely chopped salad and fruit.

Only 16 days after being placed in their new quarters, a Sandgrouse egg was found on the ground in a corner of the aviary. A slight depression in the sand indicated a nest scrape but this remained unlined. Two days later a second egg and on the following day a third egg were found. The first egg had been removed immediately for artificial incubation but we awaited completion of the clutch before removing together the second and third eggs. The adults showed little interest in the eggs and no attempt at incubation.

A second clutch was laid in early July and the eggs were again removed for artificial incubation. At that time we decided that, should a third clutch be laid, we would leave these *in situ* in the hope that the parents would show more attention than with the first clutch. However, after the first two eggs were soaked following a torrential downpour of rain, we reversed our decision and removed both eggs to the incubator, the third was also removed on the day after laying. The eggs were greenish-grey in colour, blotched with brown and the five measured ranged from 43-45 mm x 32-34 mm.

The subsequent fate of these artificially incubated eggs is tabulated overleaf; two of three eggs in the first clutch were hatched and successfully reared, two of the second clutch hatched but failed to survive and all three eggs in the third clutch were found to be addled.

The eggs were set (unwashed) in a still air incubator (Brinsea Polyhatch) at a temperature of 39-39.25°C and a humidity similar to that for incubating pheasant eggs. The eggs were turned (automatically) hourly until the 21st day of incubation when they were removed to a dry hatcher at 38.5°C. Once the eggs pipped or broke into the air-space, the humidity was increased to a minimum of 60%. Those eggs that hatched did so very rapidly, the process of hatching taking only a few hours.

The calculated incubation period of 25-26 days is less than that of 28 days reported for Pallas's Sandgrouse in the wild (Cramp, 1985) or previously in an incubator (Witherby et al, 1940).

The newly-hatched chicks were allowed to remain in the hatcher for 24 hours before being removed to a brooder box. The temperature was maintained at 35°C for the first three days in the brooder then gradually lowered over the next few weeks.

FIG. 1: SUMMARY OF ARTIFICIAL INCUBATION OF PALLAS'S SANDGROUSE EGGS AT CHESTER ZOO, 1985

Egg Number	Date Laid	Date Set	Date Hatched	Incubation Period	Comments
1	19 June	20 June	-	-	Advanced embryo; dead in shell
2	21 June	24 June	19 July	25 days	Hatched and reared
3	22 June	24 June	19 July	25 days	Hatched and reared
4	6 July	8 July	1 August	25 days	Hatched, died at one day old
5	8 July	8 July	2 August	26 days	Hatched, died at six days old
6	10 July	10 July	-	-	Advanced embryo; dead in shell
7	14 July	16 July	-	-	Addled
8	16 July	16 July	-	-	Addled
9	18(?) July	19 July	-	-	Addled

The chicks were fed chick mash (dampened then mixed to form fine crumbs), finely diced carrot and apple, chopped lettuce and grated hard-boiled egg; small mealworms were also relished. Chick grit was mixed with the food from the second day and water supplied in a shallow trough. At four weeks old millet was introduced into the diet, followed by wheat at six weeks.

The facial markings of the young male were distinct before he reached three months. The second chick proved to be a female which, when paired with an adult male in 1986, laid eggs from which two chicks were hatched. One of these, a female, was successfully reared and, with the loss of one adult male last winter, we now have a group of four males and three females.

Our stock was captive bred at Rotterdam Zoo where Pallas's Sandgrouse have been bred since 1980. The International Zoo Yearbooks report an earlier success in 1979 at East Berlin Zoo but we have been unable to find any previous records of Pallas's Sandgrouse being bred in the United Kingdom.

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As described above, Pallas's Sandgrouse *Syrrhaptes paradoxus* has been bred at Chester Zoo and this is believed to be the first success in this country. Any other knowledge of a previous breeding in Great Britain or Northern Ireland or of any other reason that would disqualify this claim, is asked to write to the Hon. Secretary.

* * *

BREEDING THE COBALT-WINGED PARRAKEET

Brotoogeris cyanoptera

By PHILIP and JANET CLARKE

(Kent)

Early last year we purchased two of these South American parrakeets each from different sources. The cock bird was in very good condition but the hen, having been kept on seed only, looked very poorly. Her feathers were dull, she was very thin and her beak and claws were overgrown. After veterinary treatment and the correct diet of mainly fruit with Parrot Mix, Budgerigar seed, boiled egg yolk and vegetables, she soon recovered.

We considered ourselves very lucky to have purchased a pair of these birds, as it is almost impossible to tell their sex by sight, the coloration and size appearing identical although the yellow on the cock's forehead is perhaps a little brighter. Our birds got on well from the beginning and were soon feeding each other.

As we believe in keeping our birds indoors, rather than exposed to all weathers, we installed the Cobalt-winged Parrakeets in the spare bedroom along with a pair of African Greys and a pair of Jardine's Parrots. They

age measures 2 ft x 1½ ft x 1½ ft (0.60 x 0.46 x 0.46 m) with a nest-box attached to the outside measuring internally 5 x 5 x 8 in (0.13 x 0.13 x 0.20 m). The nest-box is not upright but angled at 45°. Peat is used to line the bottom and a trap door is cut into the front for inspection.

We were soon rewarded with four eggs and after 30 days, when we thought that they had gone over their time and all was lost, the first chick hatched on 18th July (1985). We could not believe our luck when the other three hatched during the next few days.

Although the hen appeared to be feeding the chicks well (we added more fruit and egg yolk to the diet) we were worried that the last pair hatched would eventually be neglected as these were quite a bit smaller. We decided, therefore, to take all the chicks and hand-rear them.

They grew very quickly, their eyes opening at about 10 days, and the quills soon appeared under the skin. The rearing food consisted of baby food (Milupa Winter Vegetables), Heinze baby pure fruit, shelled sunflower seeds, and calcium tablets with vitamin D. All this is put in the liquidiser with boiled water and mixed to a not-too-runny consistency.

They had been kept in a temperature of 80° F, which was lowered gradually over a few days when they were fully feathered. They began to eat fruit on their own and managed to demolish whole apples, which had been sliced, leaving just the skin. They eventually ate seed as well but still preferred the fruit.

Since then we have had a few failures with clear eggs, or fertile eggs not hatching, but another chick was hatched on 13th October 1985, which was hand-reared and at the moment (July 1986) we have three more chicks who have just left the brooder and are flying but refuse to eat on their own, so we are quite pleased with the number we have reared and hope that our pair of Cobalt-winged Parrakeets will go on laying and producing such delightful little birds.

As described above, the Cobalt-winged Parrakeet *Brotogeris cyanoptera* has been bred by Mr. and Mrs. Clarke and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

* * *

SOME NOTES ON BIRD MARKETS, PIGEON KEEPING AND OTHER BIRD/MAN RELATIONS IN CHINA

By JEFFERY BOSWALL
(Natural History Unit, B.B.C., Bristol)

These notes are concerned mainly with bird markets in the People's Republic of China, but will embrace one or two other aspects of man bringing birds into captivity: pigeon racing, the pigeon fancy, pigeon whistles, cormorant fishing, and birds in traditional medicine.

In an earlier issue of the *Avicultural Magazine* I published an article on birds in Chengdu Zoo (Boswall, 1986).

The only recently published article that I know of which deals with Chinese aviculture as such is that of Travnicek (1986), a United States aviculturist who toured five major cities in mainland China and visited bird markets, pet shops and zoos. He presents much interesting information.

The bird names in this paper are mainly those of Meyer de Schauensee (1984).

Bird markets in Beijing

So many earlier writers on Chinese ornithology (notably Wilder and Hubbard, 1924) quote from their visits to Chinese bird markets that in 1983 I sought out the largest of the three markets known to be in Beijing. It was at Guan Yuan. Unfortunately I could spend only 10 minutes there on 2nd May, but was able to identify Budgerigar *Melopsittacus undulatus*, Canary *Serinus canaria*, Red-billed Leiothrix or Peking Robin *Leiothrix lutea*, Eurasian Siskin *Carduelis spinus*, Hawfinch *Coccothraustes coccothraustes*, Common Quail *Coturnix coturnix*, Siberian Rubythroat *Luscinia calliope*, Eurasian Tree Sparrow *Passer montanus*, Mongolian Lark *Melanocorypha mongolica*, Bohemian Waxwing *Bombycilla garrulus*, Hoopoe *Upupa epops*, Red-billed Magpie *Urocissa erythrorhyncha* and Woodcock *Scolopax rusticola*. There was also a species of tit, probably Marsh Tit *Parus palustris* and a small *Accipiter*, possibly *nisus*. The Red-billed Magpies were half-grown nestlings.

On 21st May 1983 I returned to the market and attempted a complete census. Thirty-seven Budgerigars and six Canaries were for sale. With the possible exception of the Quails, of which there were five adults and five halfgrown young ones, and perhaps the 11 Peking Robins, all the other birds were almost certainly wild-taken.

The presence of 28 Chestnut Buntings *Emberiza rutila* (10 males and 18 females), a species known to pass through in mid-May (Hemmingsen

951), plus the fact that there were none in the market on 2nd May, can be taken as indicating that a number of species are not only *wild* caught but *recently* caught. It also seems probable that most are *locally* caught, positive exceptions being only the Hwamei (or Brown Laughingthrush) *Garrulax canorus* (two birds), the Mongolian Lark (17 adults, c. 40 nestings) and (if wild caught) the Peking Robins. These species do not occur naturally in the vicinity of Beijing.

The number of other species were: four Coal Tits *Parus ater* six probable Marsh Tits, one possible Willow Tit *P. montanus*, one Great Tit *P. major*, 29 Eurasian Siskins, 18 Yellow-billed Hawfinches (also known as black-tailed Hawfinches) *Eophona migratoria*, 23 Hawfinches, two Shore larks *Eremophila alpestris*, one Common Skylark *Alauda arvensis*, two Crested Larks *Galerida cristata*, two possible Asian Short-toed Larks *Alaudrella cheleensis*, two Brown Shrikes *Lanius cristatus*, one Blue-rook *Erithacus secicus*, one possible Thick-billed Reed Warbler *Acrocephalus aedon*, one Tree Sparrow, one male and two female Black-faced buntings *Emberiza spodocephala*, one female Yellow-browed Bunting *E. chrysophrys*, two male Yellow-throated Buntings *E. elegans*, five unidentified buntings (Emberizidae), five Mealy Redpolls *Carduelis flammea*, seven unidentified Fringillids, and one other unidentified passerine.

Anthony Galsworthy, on a visit to the same market the next day, 3rd May, recorded the following less usual species: White-throated Rock Thrush *Monticola gularis*, Blue Rock Thrush *M. solitarius philipensis*, Pere David's Laughingthrush (or Peking Hill Babbler) *Garrulax widi*, Chinese Sparrowhawk *Accipiter soloensis*, Eagle Owl *Bubo bubo*, Thick-billed Shrike *Lanius tigrinus*, Tristram's Bunting *Emberiza tristrami* and Japanese (or Masked) Hawfinch *Eophona personata*, in addition to several of the species I recorded above. His visit was on a Sunday when apparently more cage bird enthusiasts appear than on the other days of the week.

On 21st May, 30 yuan (then about £10) was asked for a Hwamei, and 10 yuan for a Mongolian Lark. These two species are the first and second most popular native cage birds in China. A Yellow-billed Hawfinch cost 5 yuan and a Brown Shrike or a bunting ½ yuan.

Most birds were displayed in cages, usually rather small, sometimes overcrowded. A few individuals (often hawfinches) had string halters and were tethered to a stick. One stall-holder had tied together with a piece of string the wings of each of his birds. The knot was across the tips of the primaries. Another had taped the beaks of several hawfinches.

Three years later, on Sunday, 16th June 1986, starting at 10.30, I



Harold Summer

Cages at Guan Yuan bird market, Beijing, 2nd May 1983. The lower cage contains two *Accipiters*.

spent an hour counting the birds in the same market. Setting aside the domestic Common Quail, there were 431 birds of 39 species (33 of which were specifically identified). Sixty-five (15%) were Budgerigars, 57 (13%) were Zebra Finches *Taeniophgia guttata*, 51 (12%) were Hwameis, 4 (11%) were Mongolian Larks, 28 (6%) 'other' larks, and 38 (9%) were Canaries. There were only 11 (2.5%) Chestnut-flanked White-eyes *Zosterops erythropleura*, 11 (2.5%) Peking Robins and 6 (1.5%) parrots.

Such a market as this merits a detailed study, since data of seasonal occurrence and breeding season can be inferred - see McClure and Chanyaphun (1971) who undertook systematic censuses at the Bangkok bird market in Thailand.

The two smaller bird markets in Beijing are at Longtang Hu and Qiaoyang Men.

The only other recent observations I know of are those of Travnicer (1986), Fiebig (1983) who lists 36 species in a Beijing bird market, and Beecroft (in press) who visited three or four bird markets in China. Earlier Wilder and Hubbard (1924) often cited records of birds in markets to help assess passage periods and relative abundance.

I am indebted to Anthony Galsworthy for the following note on the effects of the Cultural Revolution on bird markets. He writes: 'So far a

*Harold Summers*

Seller with Azure-winged Magpie *Cyanopica cyana*

I know the bird markets in Peking disappeared in about 1966, and only restarted in the mid-seventies. During the Cultural Revolution any hobby or other activity which detracted from a rigid attention to politics was frowned on. I can recall newspaper criticism of 'the evil wind of goldfish rearing' and 'the evil wind of pigeon fancying'. It seems unlikely that the rearing of cage birds fared any better, although some people must have continued in what little privacy then remained in their own homes. At the same time the habit of attaching whistles to domestic pigeons disappeared - from 1968 to 1972 I never heard pigeon whistles in Peking. They are now common again: a flight of pigeons with whistles, sounding like an attacking Stuka, often causes consternation as it passes over the British Embassy tennis courts! Pigeon whistles can now be bought again at bird markets, and are being manufactured again in the traditional way.' Pigeon whistles are dealt with later in this article.

Chengdu, Sichuan, bird markets

On Sunday, 18th May 1986, I went to the larger of two Chengdu bird markets - the one at Qingyanggong. With the aid of William W. Thomas I attempted a census of all the birds present.

Of the 22 species on offer, one was presumably for food - the domestic

Quail. So too may have been the single pigeon *Columba livia*. (There is a quite separate and equally crowded pigeon market in Chengdu at which both fancy birds and racers are sold). The young Northern Goshawk *Accipiter gentilis* was unlikely to be on sale for falconry purposes; more likely it was on offer as a source of traditional medicine. My enquiries about falconry in Sichuan proved negative. Elsewhere in China, e.g. in Inner Mongolia and Sinkiang, there is reason to believe that this practice is extant. See also under 'Bird Trapping' below.

The remaining 19 species were traditional 'cagebirds', i.e. musical songsters, likely talkers and those of ornamental appearance.

Among those valued for their song, the Hwamei or Brown Laughing-thrush was easily the most common, 186 individuals being on display, comprising 38% of the total of 487 individuals of 19 species of 'cagebird'. The species has a loud and tuneful song. So does the Mongolian Lark, but only three individuals of this non-local species were on offer. However, of the Oriental Skylark *Alauda gulgula*, which nests, for example, on the Chengdu airport, there were for sale two adults and 20 nearly full-grown nestlings.

Of species likely to copy human speech, there were only two, both parrots. There were two Slaty-headed Parrakeets *Psittacula himalayana fischii* and 44 Earl of Derby's Parrakeets *Psittacula derbiana*. Thus, parrots were 9% of the total.

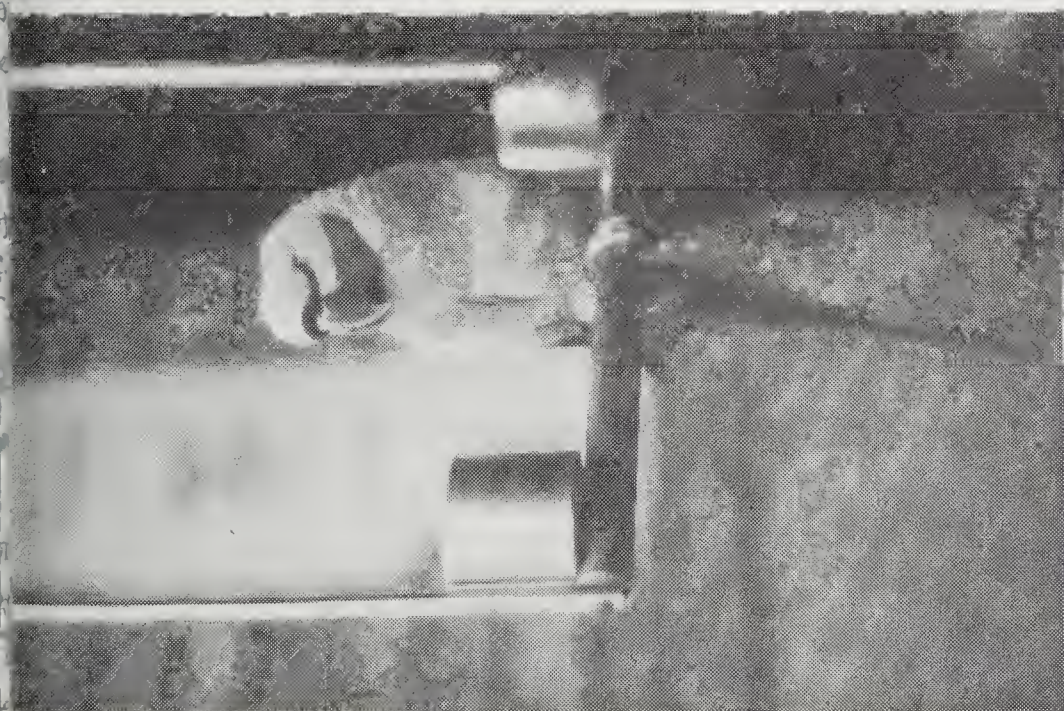
Certain species are pleasing to both ear and eye, like the Red-spotted Bluethroat (an adult and two apparent youngsters were present) and others to the eye like the Peking Robin (71 birds, 15%).

Seed eaters included 17 Grey-capped Greenfinches *Carduelis sinica* (3%), one Black-headed Greenfinch *Carduelis ambigua*, two nestling Eurasian Tree Sparrows, one Russett Sparrow *Passer rutilans*, two Yellow-billed Hawfinches and four Rosefinches (including one cock) not certainly identified as to species but probably Common Rosefinches *Carpodacus erythrinus*.

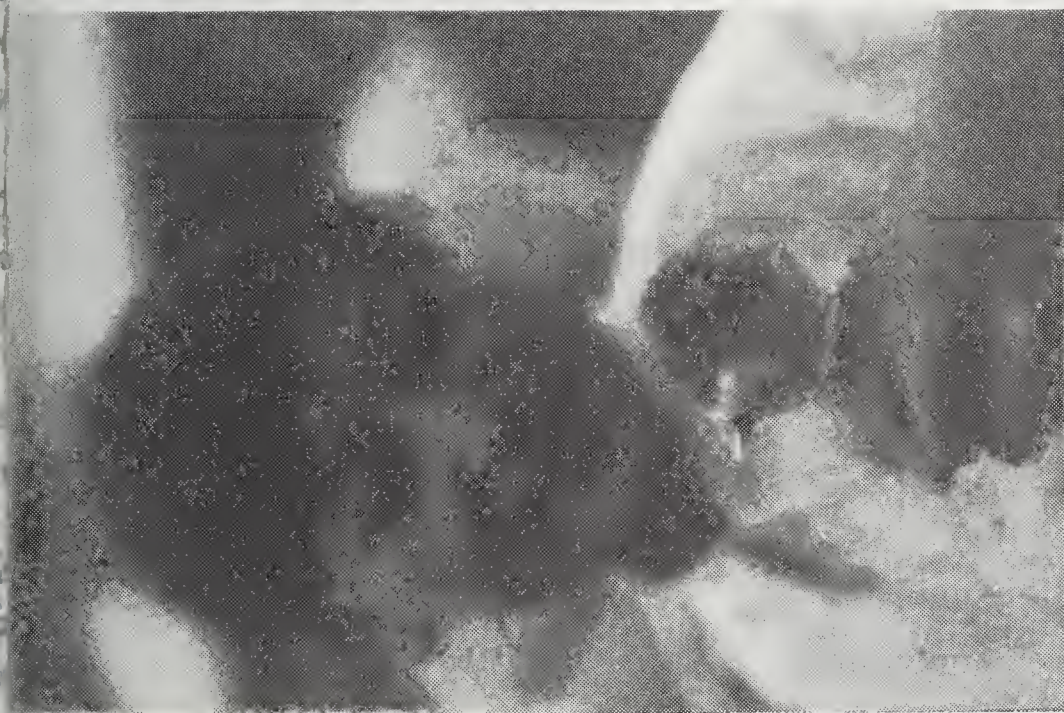
This leaves, among the indigenous birds only a Brown Shrike *Lanius cristatus*, two Striated Munias *Munia striata*, 29 Chestnut-flanked White eyes (6%) and an unidentified nestling, probably a Magpie Robin *Copsychus saularis*.

Exotics were 62 Canaries (13%) (all yellow or yellowish apart from two reddish ones and a dozen white ones), and 34 Budgerigars (7%) (two white, seven blue, seven green and 18 yellow).

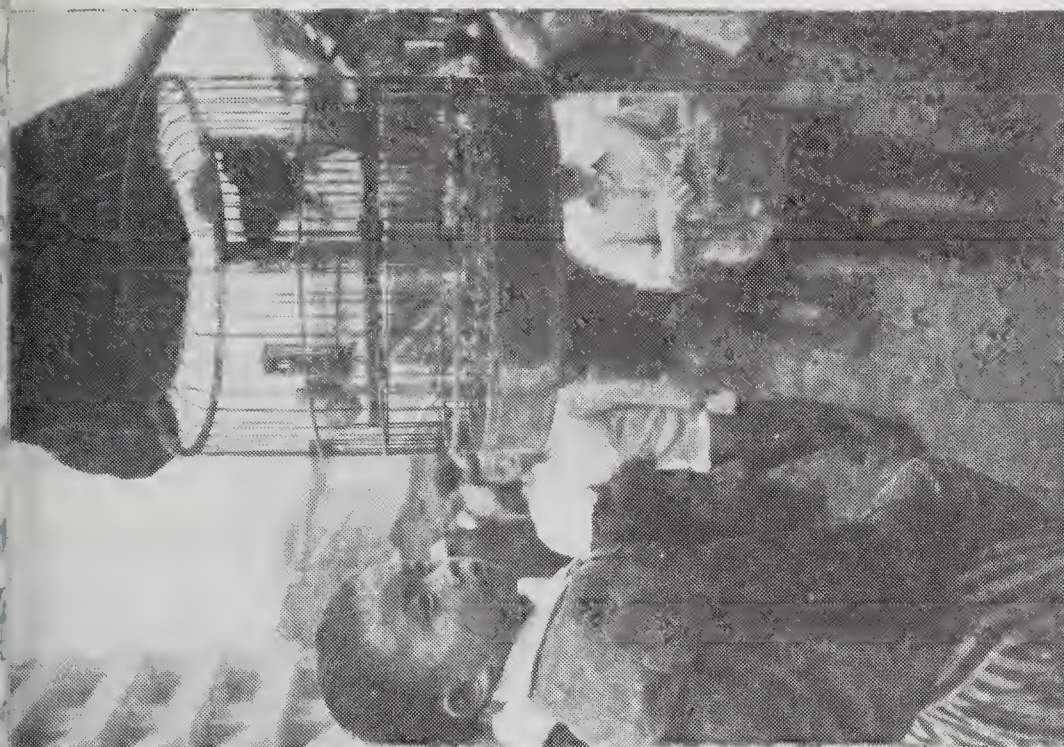
To sum up, there were 487 birds of 19 'cage bird' species at this Chengdu market, plus 102 birds of three other species (*Coturnix*, *Columba*, *Accipiter*). The most common cage birds were the Hwamei, 38%, the Peking Robin, 15%; the Canary, 13%; the two larger parrots, 9% together



Earl of Derby's Parrakeet



Boy with young presumed Magpie Robin



Jeffery Boswall

Chinese child and somewhat frightened
juvenile Hwa-mei (Brown Laughingthrush)

Qingyanggong bird market, Chengdu, Sichuan, early June 1986

the smaller parrot (the Budgerigar), 7%; and the Chestnut-flanked White-eye, 6%.

William W. Thomas had earlier visited this market six times, first on 4th October 1985 and then at monthly intervals on average. The following list is of the 21 species he saw, *additional* to those present on 18th May, the first two being raptors, the second two of possibly domestic origin and the rest conventional 'cage birds':-

Common Buzzard	<i>Buteo buteo</i>
Tawny Eagle	<i>Aquila rapax</i>
Common Pheasant	<i>Phasianus colchicus</i> (possibly domestic)
Golden Pheasant	<i>Chrysolophus pictus</i> (possibly domestic)
Blossom-headed Parrakeet	<i>Psittacula roseata</i>
Rufous-bellied Woodpecker	<i>Picoides hyperythrus</i>
White Wagtail	<i>Motacilla alba</i>
Light-vented Bulbul	<i>Pycnonotus sinensis</i>
Long-tailed Shrike	<i>Lanius schach</i>
Black-naped Oriole	<i>Oriolus chinensis</i>
Tufted Mynah	<i>Acridotheres cristatellus</i>
Eurasian Jay	<i>Garrulus glandarius</i>
Grey Tree Pie	<i>Crypsirina formosae</i>
Red-billed Magpie	<i>Urocissa erythrorhyncha</i>
Siberian Rubythroat	<i>Luscinia calliope</i>
Blue Whistling Thrush	<i>Myiophoneus caeruleus</i>
Common Blackbird	<i>Turdus merula</i>
Grey-backed Thrush	<i>Turdus hortulorum</i>
Red-tailed Laughingthrush	<i>Garrulax milnei</i>
Green-backed Tit	<i>Parus monticolus</i>
House Sparrow	<i>Passer domesticus</i>

On a later visit in June 1986, I added two more species to the list:-

Black Kite	<i>Milvus migrans</i>
Common Kingfisher	<i>Alcedo atthis</i>

The smaller bird market in Chengdu is at Qinchengshan. During the same winter, 1985-86, William W. Thomas saw there about 10 species additional to those at the larger market.

A paperback volume on aviculture (Yi, 1982) was one of only two books on birds that could be found in a large specialist bookshop in Changchun. It is called *The Breeding of Fancy Birds*, and 54,000 copies were produced. Illustrations make clear how to catch wild stock. Else



Jeffery Boswall

Longtang Hu Bird Market, Beijing, 16th June, 1986: (above) caged Mòngolian Lark; (left) tethered young Japanese Grosbeak.



Guan Yuang Bird Market, Beijing, 16th June, 1986:
(below left) two caged Yellow-throated Buntings; (below right) tethered Azure-winged Magpie.





Fig. 1. Siberian Rubythroat *Luscinia calliope* in a cage of typical Chinese design and made of bamboo. Drawn by Peter H. Ryley.

where in China I later found the following books: *The Avoidance and Cure of Bird Diseases* by Xing Chao'an and Yan Zhengfan (1985), of which 10,000 copies were printed; also *The Care and Training of Larks* edited by Zhang Xiaosi (1984), 15,500 copies; and *The Keeping and Breeding of Cage Birds* by Lu Jiechuan and others (1984), 29,000 copies.

Birds trained to do tricks

Anthony Galsworthy observed birds at the main Beijing market being used to perform tricks (1983, pers. comm.). He writes: 'On 22nd May 1983, Ken Searle and I watched a Chinese doing tricks with hawfinches as described in Hemmingsen (1951). He had about three of the Japanese (or Masked) Hawfinches, all males, tied with strings round their breasts, with clips. He released one bird onto his hand, then with the other hand threw a small white ball high in the air, simultaneously throwing the bird in the air. As the bird flew up to catch the first ball he threw the second after it. The bird on each occasion I watched, caught both and returned to his hand, depositing the balls in his palm. It was rewarded with a seed. A second man had a male Brambling which was similarly trained; but on this occasion it caught a seed thrown in the air, rather than a ball, and returned to the hand.'



Caroline Weaver

A stall selling not birds but cages, china holders for food and water and one trap (an oblong device on the ground, nearest camera), Chengdu, 1985.

Bird trapping

To supply the markets birds must be trapped or otherwise 'taken' in the wild. Hemmingsen (1951) deals with trapping in the 1940s and more recently Beecroft (in press) gives a valuable account of trapping over two and a half months in 1985 at a locality on the Yellow Sea coast.

I can add only the following:

William W. Thomas (1983, pers. comm.) writes of his stay in Beijing in the late 1970s: 'There were a number of bird-trappers who worked the brush around the Ming Tombs Reservoir, usually with mist nets. Their usual game included several species of *Parus* and *Emberiza*, *Phylloscopus* and *Aegithalos*. The nets were tended very carefully, and some of the trappers wanted their birds alive. Others killed them as soon as they were free of the net, presumably for food. There were also hunters using air guns and even ancient muzzle-loaders, but they were after ducks and shorebirds. I once saw a peasant carrying a large female Northern Goshawk *Accipiter gentilis* which he used against quail and thrushes.' (Hemmingsen, 1951, mentions the netting of Northern Goshawks for use against hares).

In the grounds of my hotel at Qiqihar, Heilongjiang province, on 8th May 1983, I (J.B.) found a local bird-catcher with six traps slung from a tree. In a bottom compartment each contained a decoy Eurasian Siskin. A supply of millet was positioned so as to be available not only to the call bird but also to potential victims, four of which could be caught in separate traps above. See Caroline Weaver's photograph.

Cormorant fishing

As recently as 1982 the use of Great Cormorants *Phalacrocorax carbo* for fishing was observed near Beijing; on at least two occasions Anthony Galsworthy saw one or two boats, each with one or two fishermen, operating on the canal that runs alongside the 'back' road to the Summer Palace. The site was 1-2 kms before the Palace. In May 1985, D.S. Melville saw several rafts with captive Cormorants near Guangzhou (Canton). In May and June 1986, I saw Cormorant fishing in progress at two widely separated localities, each about an hour's drive from Chengdu. Maryse Addison (pers. comm. 1986) saw a recent film about Cormorant fishing shot on Hainan Island. It would seem from these instances alone that Cormorant fishing, despite rumours to the contrary, is still widespread in China. A recent account of this behaviour in Guilin in China is that of Egremont and Rothschild (1979). One feature is a possible example of counting ability in birds. After a bird has brought seven fish to its owner, the bird is allowed to eat the eighth. The bird apparently 'goes on strike', refusing to move, unless it is fed every eighth fish.

Cheng (1937) traces Cormorant fishing in China back to 317 BC, earlier than the earliest dates given by Campbell and Lack (1985), i.e. the Sung dynasty (960-1298 AD). But Zhang (1985) is surely mistaken in stating that Cormorants trained in China to catch fish 'are not bred in captivity'. At a location in Sichuan I was told by a Cormorant fisherman that the eggs laid by his birds were hatched out under hens and the resulting young raised by human hand. The widespread incidence of albino and semi-

加弹子数,训练成绩好的鸟可连续接住抛向高空的 3~4 粒弹子。但接物技艺的训练和表演只能在秋、冬季和早春,以后由于繁殖期近,成绩难以巩固。

3. 戴面具

戴面具的技艺是用各种小型面具由鸟嘴衔住象戴面具一样(图 57)。主要用于小型鸟的训练,如朱顶雀、黄雀。

面具的制作方法:
用白果(银杏)沿边线对剖成二半,去除果肉,在白果壳的中部用 24# 细铜丝串连固定,这是鸟嘴衔住面具的部位,然后在白果壳的正面画成脸谱,可以做 4~5 个各色脸谱。

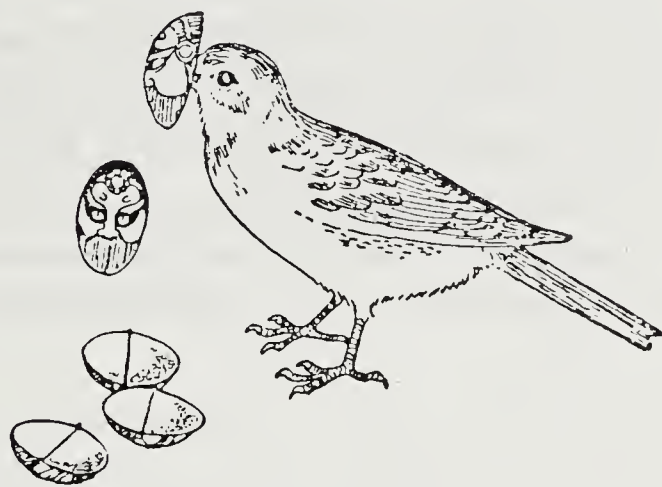


图 57 戴面具

训练方法:训练的鸟先要训成能放飞的,训练时使鸟有饥饿感,用几粒饲料放在白果壳内任其啄食,使其熟悉而不畏白果壳,接着用手捏住苏子给鸟啄食,并将面具给鸟使它能衔住,当然这过程是要花些功夫,如鸟能衔住要奖励苏子 1~2 粒,以后就将脸谱放在台上让鸟衔起,如能衔住再将几个面具排列于鸟的前面,如鸟能正确衔住就奖励苏子 1~2 粒,使鸟形成衔起面具就有饲料吃的条件反射,训练成绩优良的,可以接连调换 3~4 个面具,表演时很能引起人们的兴趣。

4. 撞钟

撞钟是利用鸟啄食钟槌上的饲料而推动钟槌撞击钟。钟可悬挂于笼外,钟槌悬在笼内,一半伸出笼外靠近钟,钟槌可以收起或放下,以控制鸟撞击。

albino birds is also highly suggestive of domestication. For example, of the 15 birds owned by my interviewee, one was a complete albino and two more were partly white. Of course, it is no doubt also true that from time to time new stock is trapped in the wild and brought into captivity. I was told that Cormorants live for 20 years, and that mature birds sell for 400-500 yuan (£90 - £115 in October 1985), and young birds for 100-200 yuan (£23 - £45).

Pigeons

The only large Chinese cities in which I have spent significant periods of time are Beijing and Chengdu. The most conspicuous birds by far are Rock Doves *Columba livia*, but they are birds from owners' lofts and not feral 'street' pigeons. *Not once* did I see, in either city, a pigeon on the ground in park or town square, garden or roadside patch. And yet high above, flocks of birds are continually on the move.

The racing of pigeons is a common sport, and pigeons are also bred for eggs and meat.

On 1st October 1985, I visited a pigeon market in Chengdu, the capital city of Sichuan province. The majority of the hundred or so boxes or cages that had been brought contained homers. I was told that in Sichuan, one of 26 Chinese provinces, albeit the second largest, there were 8,000 members of the pigeon association, with 2,000 in Chengdu alone.

'Ordinary' pigeons were selling for 6 yuan (about £1.25), those with experience over 500 km courses for 10-20 yuan (about £2-£4), 1,000 km birds for 200-500 yuan (about £40-£100) and 2,000 km birds (that, for example, home 1,400 km from Inner Mongolia to Chengdu in two days) for 500-2,000 yuan (about £100-£400). In fact, there was only one bird in Chengdu worth 2,000 yuan.

At the other extreme, pigeons to eat cost 2-3 yuan each!

Also for sale were three different pigeon magazines, each a monthly, and five different pigeon paperbacks; also serially numbered rings, of course, and magnifying glasses for inspecting pigeons' eyes.

Of particular interest were the pigeon whistles. These are attached in an upright position to the tail of a pigeon, and when the bird takes off air passes into the forward facing orifice and a pleasing note is struck. Nowadays only a few whistles are made of bamboo and gourds - in Chengdu, at least. Instead they are fashioned from nut husks or plastic. One common design employs a table tennis ball! Before selling a whistle the stall holder insists on a demonstration of the instrument's musicality. He attaches the whistle to one end of a specially designed stick nearly a metre in length and then spins the stick from the other end.

A whistle may be a single sound producer, or more likely a combina-

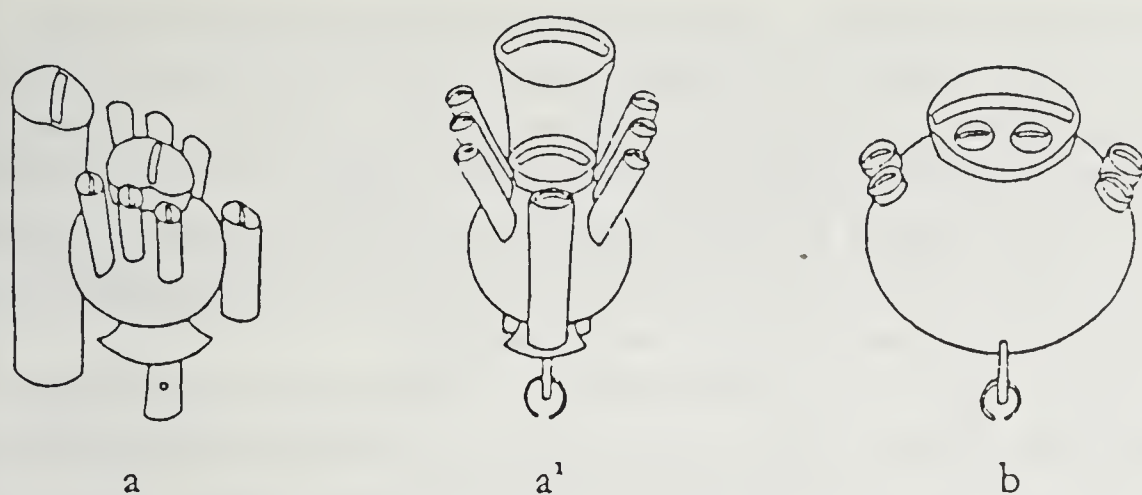


Fig. 3. Two pigeon whistles drawn about 1900 and reproduced with permission from Tun Li-ch'en (1936). Drawings (a) and (a') are the side and front views of the same whistle. The drawings are one-half of the actual size. Each whistle is made of a gourd and bamboo (the original caption says merely 'bamboo'), and each weighs 10 grams. When the pigeons wheel overhead their sound rises even to the clouds, containing within it all five notes (of the Chinese scale). Truly it gives joy, and a release to the emotions!' (Tun Li-ch'en, 1936, *Annual Customs and Festivals in Peking*, p. 22).



Fig. 4. Pigeon with whistle in position. Each large tube is made of bamboo and has an orifice; also each tube has two smaller tubes inside each with its own orifice. Thus there are six pipes in all. (After Berthold Laufer [1934]. Pigeon Whistles. *Field Museum of Natural History Bulletin*, Vol. 55, No. 9).

tion of up to 19 'pipes'. Laufer (1934) wrote about, and illustrated, the collection of Chinese bird whistles held in the Field Museum of Natural History in Chicago. It is clear that some of the compound whistles are of intricate and beautiful design, and no doubt produce a pleasing combination of notes. Imagine a flock taking off each bird carrying a compound whistle! In fact, I have heard these flying orchestras at two widely separated locations in Sichuan province and in Beijing.

A Beijing collector of these whistles has written about their history and craftsmanship (Wang, 1963). He had over 300 examples, including many contemporary ones, but also some from the Qing dynasty (1644-1912). But he had none from the time of the Song dynasty (1127-1279) when the craft was already thriving. The custom is said to have originated in the Tang dynasty (618-907).

Tun Li-ch'en wrote in 1900 about pigeon whistles in Peking and illustrated two of them (see figure 3) (Tun, 1965).

Yu (1956) has written about the fancy breeds of pigeon favoured in Beijing in the early 1950s. Earlier, in 1900, Tun Li-ch'en had listed 13 'ordinary varieties' of pigeon by name (e.g. 'Phoenix-headed white' and 'Taoist priest hat') and 23 of 'valuable varieties' (e.g. 'Wild duck of the Great Dipper' and 'Striped sandals').

Birds in traditional medicine

Four visits to the traditional medicine market in Chengdu, two in October 1985 and two in May/June 1986 showed skins of the following species for sale (usually only one or two of each, but nine Common Buzzards on one day):-

- Black Baza *Aviceda leuphotes*
- Lammergeyer *Gypaetus barbatus*
- Black Vulture *Aegypius monachus*
- Northern Goshawk *Accipiter gentilis*
- Probable Upland Buzzard *Buteo rufinus*
- Common Buzzard *Buteo buteo*
- Probable Golden Eagle *Aquila chrysaetos*
- 'Small' eagle Accipitridae
- Bubo*-sized Owl Strigidae

Only the heads and toes are sold. A boy offered me a whole, freshly dead buzzard for 20 yuan (about £4.60 in October 1985) or toes at 1.50 yuan (about £0.35) each. By comparison with the sale of botanical, reptilian and mammalian items, avian 'parts' appeared to be in very little demand. Even so, there could be a deleterious effect on wild populations.

It appears that the heads and toes of raptors are boiled in water and the resulting soup is drunk. As to the ailments supposedly cured or relieved, the claims are so wide-ranging as to create suspicion about their validity.

The Northern Goshawk, Tawny Eagle and Black Kite for sale alive in the Chengdu bird market (see earlier) are believed to have been on sale for their medicinal value.

ACKNOWLEDGEMENTS

I am grateful to Anthony C. Galsworthy and William W. Thomas for allowing me to incorporate their data and to Nigel Collar for drawing my attention to Travnicek's paper. Iain C. Orr helped greatly with the literature. Martin Williams allowed me to see a draft of Beecroft (in press) in advance of publication; he also helped with fearless criticism of an earlier draft. Minna Daum helped with translation and interpretation. Mike Wilson saved me from a sizeable number of nomenclatorial indiscretions. David Melville helped in the additional facts, re-interpretations and general corrections.

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FIELD AND AVIARY NOTES ON THE BEHAVIOUR OF THE CRIMSON FINCH *Neochmia phaeton*

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and

ANTHONY J. BOUGHER

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Introduction

The Crimson Finch *Neochmia phaeton* is one of the most beautiful of the Australian estrildid finches. The male is predominantly blood red to crimson in colour and, although the female is browner and less bright, she too is an attractive bird. It is certainly a desirable species for aviculture but has a reputation of being difficult to keep and breed. Not surprisingly perhaps, it is scarce in Europe and relatively expensive to buy. A pair of Crimson Finches was worth about £135 in the U.K. in 1982, compared with £30 for a pair of Longtail Finches *Poephila acuticauda* and £35 for a pair of Gouldian Finches *Chloebia gouldiae* (Evans and Fidler, 1986). Crimson Finches are much less expensive in Australia, however, where in 1982 prices varied from about £16 to £20 per pair (Evans and Fidler, loc. cit.). This difference can, however, be attributed to the availability of wild-caught Crimson Finches in that country. The Australian Government banned the export of finches, and all other native fauna, to other parts of the world under its Prohibited Exports Regulations in the early 1960s. Consequently, only domestically-bred birds are now available outside Australia. Some licenced finch-trapping continues nevertheless for the Australian cage bird market which is centred on the town of Wyndham, in the Kimberley region of north-west Australia. The trade is a dying one because the Western Australia wildlife authority, which controls it, has adopted a policy whereby it will renew licences for existing trappers, but will not issue them to new applicants. The numbers of trappers have, therefore, dwindled from 55 operating in the Kimberley in 1958 (Immelmann, 1965) to nine by 1982 (Evans and Fidler, loc. cit.).

Difficulties in establishing the Crimson Finch in captivity are usually attributed to its aggressiveness. Immelmann (1965) describes how truculent encounters frequently occur between individuals which come close to one another under natural conditions, and Blewett & Krøyer-Pedersen (1978) suggest that members of this species are so aggressive in captivity that successful breeding can be achieved only by isolating pairs in separate flights. Even then, there may be problems. Some males repeatedly chase

their mates, driving them from the nest, and, in extreme cases, they may actually kill them (Immelmann, 1965). We believe, however, that the case against the Crimson Finch has been overstated. It is undoubtedly aggressive in some circumstances, but we present evidence from two sources which suggest that this is less of a problem than is usually supposed. The first arises from field observations of wild birds made by the authors in the Kimberley. The second comes from discussions with Mr and Mrs Hugo Austla who use the colony system for breeding Crimson Finches in aviaries at Wyndham (W.A.).

Field observations

The Crimson Finch occurs across most of northern Australia and also inhabits southern parts of New Guinea (Blakers, Davies and Reilly, 1984). It is usually seen near surface water where there are groups of the palm *Pandanus odoratissimus*. Observations described in this paper were made at pools of these kinds along otherwise dry creeks in areas adjacent to the Wyndham-Kununurra and Wyndham-Gibb River roads in the eastern and central Kimberley. The study was made in July and August 1985.

Crimson Finches were almost always seen in groups and each of these evidently lived in more-or-less permanent association with a particular pool and its pandanus. What were almost certainly the same birds could be observed regularly at, or close to, the 'home' site. These birds had probably nested in the pandanus during the previous wet season because we found 'used' Crimson Finch nests at several of the study sites. They were usually positioned near the bases of the pandanus leaves. Overall, observations were made of 15 groups of Crimson Finches; their mean size was 13.2 (standard deviation, 6.4). Each group included some adult males in full nuptial plumage, some adult females and some immature birds; the latter were either still in juvenile plumage or in the process of moulting out of it.

Members of the groups roosted in the pandanus at night and also spent much of the day perched in them. They foraged together in the adjacent areas (i.e. usually within about 200-400 m).

Most feeding activity was confined to dense, long grass and individual birds were difficult to observe in it for longer than a few minutes. It was evident, nevertheless, that they foraged together as a flock, moving in the same general direction and maintaining individual distances of about 1 m. Crimson Finches are extremely agile climbers, using long tails as balancing organs, and perching confidently on either vertical or horizontal stems, in order to take seeds from grass panicles. According to Immelmann (1965), members of this species do not normally feed on the ground but they were often observed doing so during the present study; they were apparently searching for fallen seeds in the soil between tussocks of grass. They also

foraged on the ground in recently burnt areas. There was little aggression between members of foraging groups. Supplanting attacks were sometimes observed, usually by adult males towards other birds, but they were mild and never resulted in prolonged chases. Males in full nuptial plumage often perched or foraged close to one another (i.e. about 0.5 m apart) without eliciting hostile reactions.

Members of foraging groups responded to a sudden disturbance, such as that caused by the approach of the observer, by flying-up from the ground. If they were close to the pandanus (i.e. within approximately 10 m), they flew back to them, retreating deep into the palms, and usually remaining out of sight for several minutes. Members of groups, which were more distant from the pandanus when they were disturbed, flew into nearby trees, often flying in different directions and thereby becoming separated from one another. They subsequently regrouped by flying down to start foraging together as a flock. Loud contact calls were made by finches flying from one place to another, including flying down to forage, and probably function in keeping members of the group together.

Aviary notes

Hugo and Bev. Austla breed finches in semi-enclosed outdoor aviaries. They concentrate their efforts on Gouldian Finches *Chloebia gouldiae* but keep several other Australian estrildid finches, including the Crimson Finch. Since their captive birds are subjected to similar climatic regimes of temperature, humidity and day length as those living under natural conditions, it is not surprising that they show the same seasonal patterns of activity. Crimson Finches, for instance, come into breeding condition during the wet season (January-February) both in the Austlas' aviaries and in the wild. They stop breeding from the middle of the dry season onwards (about June).

Mr and Mrs Austla provide Crimson Finches with a standard feed mix, consisting of panicum millet (3 parts), canary seed (1 part), white millet (1 part) and Japanese millet (1 part). They also receive regular supplies of green grass leaves, and when in season, seeding grasses. A complex soft food mix, which is made from the following ingredients, is provided on a daily basis throughout the year:

12 boiled eggs, including their shells

Two dessertspoons of a commercial vitamin/mineral salts preparation

Two ounces of another commercial vitamin preparation

Four dessertspoons of skimmed powder milk

One tablespoon of table salt

Four dessertspoons of honey

Eight ounces of apple juice
Eight dessertspoons of meat meal
One cup of water

This mixture is homogenised in a food processor and then mixed with equal quantities of commercial biscuit mix and boiled seed mix.

Birds are bred in communal aviaries and, in the case of Crimson Finches as many as 15 pairs are caged together in flights measuring 4 (long) x 2 (wide) x 2 (high) m. They are provided with standard woven-baskets and open-fronted wooden (15 x 15 x 15 cm) nest-boxes. Some nesting materials, such as grass stems and coconut fibre, are placed in each box but the birds carry further materials to the nest, often preferring green grass. Individuals become aggressive as breeding activities commence but not enough to cause serious problems. They are relatively placid once nesting is underway. Young remain in the same flight as the parents until they are no longer fed by them.

Good pairs of Crimson Finches rear three broods in succession but never rear more than four per nest. Overall, the Austlas expect to rear about 80-100 young from 30 pairs caged in the two flights (averaging about three young per pair).

Mr. and Mrs. Austla carried out an experiment in 1984 which emphasises the success of colony breeding and even suggests that Crimson Finches breed more effectively when they are caged in groups than when they are kept as isolated pairs.

Three flights, each measuring 2 x 1 x 2 m, were stocked with one, two and three pairs of adult Crimson Finches respectively, and the birds were left in them for the entire breeding season. The total numbers of young reared in each flight were as follows:

1 pair in the flight: 0 young
2 pairs in the flight: 1 young
3 pairs in the flight: 25 young

Discussion

Crimson Finches are undoubtedly less aggressive than has been reported in previous studies, at least under the circumstances described in the present account. They occur in social groups in the non-breeding season and the behaviour within them is similar to that described in flocks of other estrildid finches by Evans (1970, 1972) and Evans and Patterson (1971); the movements of individuals in groups are co-ordinated and they are relatively unaggressive towards one another. Similarly, Crimson Finches can be caged together in groups in captivity and will even breed

successfully in colonies which are confined in relatively small aviaries.

Further studies are needed to explain the discrepancies between the present findings and previous accounts. One possibility is that the groups observed by us were kin groups (i.e. consisted of closely related individuals). Indeed, this certainly is true to at least some extent. Groups almost certainly consisted of birds (and their young) which had bred in the 'home' pandanus during the previous wet season. One would expect relatively little hostility between members of kin groups but much more aggression between unrelated and unfamiliar individuals. It may be, therefore, that high levels of aggression occur in the wild and in captivity when unfamiliar birds encounter one another, and that previous accounts are based on observations of such interactions.

ACKNOWLEDGEMENTS

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INCREASED REPRODUCTION IN A PAIR OF BARN OWLS
Tyto alba
AT THE CINCINNATI ZOOLOGICAL GARDENS
(Ohio, USA)

By MICHAEL W. DULANEY
(Head Keeper, Nocturnal Animal House)

Early in 1980, a new display was completed in the Cincinnati Zoo's Nocturnal House that was to be a permanent enclosure for the exhibition of an avian species. Since its remodelling in the mid-1960s, the Nocturnal House has displayed only mammals. A room 8 ft wide by 12 ft long and 12 ft high (2.44 x 3.66 x 3.66 m) was converted to resemble the inside of an old barn. It was constructed of authentic barn wood and furnished with a hay loft area, bales of straw, old farming tools, as well as some horse tack, the intention being to display Barn Owls in a natural setting.

The exhibit was housed indoors only, allowing greater control of such variables as temperature and photo-period. The exhibit temperature fluctuated between 65-75°F (18-24°C) and the birds were kept under a year-round 12-hour day/12-hour night cycle. From about 10:00 hours to 22:00, the display was illuminated by a 4 ft (1.28 m) blue fluorescent strip light. In the remaining hours, the birds were under the lighting of a 4 ft white fluorescent strip light.

Though the Barn Owl is considered to be one of the most widely spread species of owls found today (with subspecies found on all continents except Antarctica), there was more difficulty in procuring these birds than was anticipated. Even though they are distributed over such an enormous area, in many geographical regions they are rare. Much of this rarity is caused by the destruction of many man-made structures such as barns, old churches, derelict buildings, etc. which, over the centuries, the owls have adopted as prime nesting sites. Also, due to modernised farming methods, many owl species find it increasingly difficult to locate food in the form of rodents which were once numerous among the farmers' field and grain storage bins.

In the wild, Barn Owls are reported to have a single clutch of eggs annually with a second clutch occurring during times of food abundance (Sparks, et al, 1979). One to 13 eggs have been reported, with the average brood size being four to five. Incubation lasts 30-32 days and the eggs, which are laid on alternate days, also hatch on this two-day pattern. This may act as an evolutionary advantage for the species as a whole, for should food supplies become scarce, cannibalism of the younger chicks

by the older ones will sometimes occur. This will result in the older chick(s) surviving longer and will also reduce the total amount of food that the parents need to bring back to the nest.

On 27th March, 1980, we obtained the first owl for the exhibit - a wild-caught bird estimated to be about six months old. It came from the Riverbanks Zoo, South Carolina, and was followed, on the next day, by the arrival of two more owls. These were also wild-caught and were sent from the Department of Wildlife in Louisiana who estimated their ages at four months. All of these birds had adult plumage and were placed together in the newly-completed exhibit on 5th April, 1980.

In early March 1981, two of the birds began a constant squabbling, with the same bird always being the aggressor. The two problem birds were the ones received from Louisiana. It was assumed that the problem was related to an imbalance of sexes in the enclosure so the three birds were surgically sexed.

Many individuals feel that Barn Owls can be correctly sexed by a difference in coloration. However, it was felt that the surgical sexing method was more reliable than colour variations for proper sexing of these birds and it was therefore the chosen method.

The Louisiana birds were both males and were probably fighting over the attentions of the South Carolina bird which was a female. Now that proper sexing had been achieved, the female and the 'alpha' male were returned to the exhibit. Approximately one month later, the female was found to be sitting on her first egg. No real nest was made; it was merely an indentation in a bale of straw located in the hay loft area several feet above the exhibit floor. The female defended the nest readily by spreading her wings and rocking back and forth while vocalising (a hissing, screeching scream). Several more eggs were laid, each at two day intervals.

On the morning of 2nd August, 1981, 30 days after the discovery of the first egg, broken egg shells were found on the floor directly below the nest site. Though the mother guarded it fiercely, it was possible to catch a glimpse of a newly-hatched chick. The male was not removed from the exhibit but became excitable when the enclosure was entered. The pair successfully reared two young. By the time they were one month old, the young could only be distinguished from their parents by being slightly smaller and lacking the identification leg bands worn by the adult birds.

Exactly 30 days after the hatching of her first chick, the female, while still in the company of her month-old chicks, began to lay again. Thirty days after laying had started, the first egg of her second clutch hatched. It was known that her previous clutch had consisted of more than two eggs and we wondered whether only two young were eventually reared because of the quantity of food provided. As the second clutch

began hatching, the quantity and contents of the diet being offered to the adults was increased. The diet (per bird) of two beef heart strips, two chicken necks (skin removed) and three ounces of Nebraska Brand Bird of Prey Diet was doubled. Freshly killed mice (2-10 per day, depending on the previous day's consumption) were added to the diet. The mice were the preferred food, followed by beef heart, chicken necks and bird of prey diet.

Five young were successfully fledged this time and the cycle began to repeat. To date, this single pair has produced young in February, July and December 1982, April, August and December 1983, March, July and October 1984, January, May, August and September of 1985, and May and September of 1986 to add to the seven chicks produced in 1981. This pair is currently sitting again with a clutch of eggs which should begin hatching at the end of this month (November). In all, some 70 young have been successfully hatched and reared by this pair with several of the nesting sites occurring on the floor of the exhibit in plain view of the public. The male has never been removed from the exhibit and on many occasions has been observed bringing food to the nest site and, as the young grew older, he would assist with their feeding.

Some of these Barn Owl progeny have been sent to various zoos and nature centres for public display. The great majority, however, have been released in south-western Ohio and south-eastern Indiana. There is hope that the numbers of Barn Owls in the wild will begin to increase in areas where these birds were once plentiful but are now scarce.

In conclusion, there are probably several factors involved in the reason why our Barn Owls have been so reproductively active. Some of these may include: an enclosure which is similar to the habitat that these birds would seek in the wild; an abundance and variety of food; a temperature range suitable to the animals and/or a lighting schedule in which the birds cannot distinguish a seasonal change in the photo-period.

Products mentioned in text

Nebraska Brand Bird of Prey Diet - manufactured by Central Nebraska Packing Company, P.O. Box 550, North Platte, Nebraska 69101, USA.

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NESTING OF THE SOUTHERN LAPWING

Vanellus chilensis
IN SAO PAULO, BRAZIL

By YOSHIKA ONIKI

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The Southern Lapwing *Vanellus chilensis* is 33 cm long and weighs about 235 g. It has red eyes and a black forehead, breast and external remiges. The back is iridescent greenish grey and the belly white. The black tail is short, with white base and tip. The pink bill is tipped black and the legs are long and reddish pink. Filiform feathers stick out behind the head. There is a scapular spur.

This lapwing is a very aggressive bird, inhabiting open, suburban areas where fields have been ploughed for agriculture and where there are extensive lawns or football fields. More rarely, they are found in sugar cane fields soon after they have been ploughed or when cane is growing.

Although it is a bird that uses areas cleared by humans, it is wary. It is expert at concealing its intentions, and while watching for intruders and predators, it preens its feathers calmly and slowly, elegantly, stopping to peck the ground once in a while, gradually and surely moving away from any possible source of danger. In this way, it is very difficult to find its nest except by watching the behaviour of the adults.

The observations here reported refer to five nests found between 3rd July 1982 and 18th November 1983. There is at least one breeding pair on the University campus of Rio Claro, Sao Paulo State, Brazil, and their breeding could be followed year by year.

Method of watching the nest

Because these birds are very wary of people, their nests and nesting behaviour were studied from within a car parked 80 m from the nest. Birds showed disturbance and left the nest if I sat outside the car or if someone approached the car.

Breeding season

In the Rio Claro region, nests of *Vanellus chilensis* were found from July to November. Belton (1984) reports nesting of the species from July to December. Milleo-Costa (1985) reports nesting in Curitiba between August to January with a peak in August-October. Observations of the campus pair showed that they bred twice a year.

Nests and location

All nests were found in extensive open grassy fields such as a football field, a ploughed area for rice plantation or in the open part of a sugar cane field where plants were about 30 cm tall.

The nest is in a depression in the ground, with few grass stems or roots for lining. Two nests had external diameters of 12.5 cm and 23.0 cm; internal diameters of 9 cm and 11 cm; the depth was 1.5 cm.

Clutch size, eggs and incubation

Clutch size was four eggs for one nest and three eggs for four nests. Average weight for 16 eggs was 23.1 g (range 22.1-25.0 g) and average egg measurements were 44.6 x 32.6 mm (range 41.5-48.0; 31.5-34.0 mm). Eggs were laid two days apart in one case, and had a grey-green background with black spots scattered all over but concentrated at the large end. They became rather dirty with reddish mud while incubation progressed, which made them difficult to find. They are rather pointed at one end and all eggs are placed with this end toward the centre of the nest during incubation.

Incubation sessions are very short, probably because of the wariness of the adults and the number of people walking through the campus. I was surprised that the pair was able to hatch all four eggs of the first clutch even with the disturbance. The shortest incubation session was two minutes and the longest 85 (average 22.4 min.). On 11th November 1982, from 14:10 to 18:10, the average incubation session was 12.5 minutes (range 2-45 minutes).

Just before sitting for a session, the arriving adult turns the eggs. At intervals during incubation, the adult stands up on the nest and turns the eggs with its bill, then sits down again. These movements are more common closer to hatching. Sometimes, the incubating bird half stands and preens the breast, wings and back diligently.

In the nest on the football field, a worker said there had been two eggs on 23rd July and four eggs on 26th July. If so, the incubation period for this nest should have been 24 or so days. The first egg hatched at about 10:07 on 17th August, and the last chick emerged on 18th August.

Behaviour while nesting

Both adults are extremely aggressive during their nesting period. They have the habit of rapidly lowering the body, as if incubating, in the middle of grass. If their nest is located and one tries to get the eggs for measurements, both adults call loudly, fly around the observer, and finally dip past very rapidly and give a buzzy vocalisation just before striking the observer with a wing spur.

When one approaches a nest with an incubating adult, it may stand when one is about 10 m away and walk slowly away with large strides. Adults at the nest in the sugar cane field were more wary, rising when I was 150 m away. When far from the nest, the adult flies calling loudly and ringing up its calling mate. At another nest, the sitting adult stood up and flew toward us when we were 7 m away from the nest.

All the time the observer was handling eggs for weighing and measuring, the adults flew around yelling loudly. Ten minutes or so after the observer went away, the adult walked toward the nest, moved 8 m away and preened the breast a little and walked back to the nest. Finally, it sat on the nest, pecking the ground twice.

Changeover of adults on the nest was rather interesting, being synchronised. One adult walked up slowly, the bird on the nest stood up, pecked around the nest a lot as if foraging and moved away in the opposite direction while the other approached from behind. The departing bird never looked back and moved slowly away while the second approached the nest, looked in the nest and sat. Some 10 m from the nest, the departing bird stopped, pecked on the ground, preened the head with one foot and moved a little, stopped, looked and pecked the ground now and then. It usually went to the edge of the hill below the nearby eucalyptus plantation. There it preened its left wing with its bill, shook its wings a little and moved downhill while the other remained immobile on the nest.

On 13th August 1982 at 17:23, one bird came flying down and its mate, which had been sitting on the nest, stood up. The newly-arrived bird gave faint *uau*, *uau* calls and had wings well open when it landed, but the other had the wings half open. Soon both closed their wings. The newcomer examined the nest and sat facing north while its mate departed toward the south-east, pecking the ground and disappearing downhill.

Predation or losses caused by man

Since *Vanellus chilensis* nests in proximity to man, humans easily rob its young or destroy its nests and eggs by running them over with tractors or other machines. At one of the five nests I studied, two ringed birds of the four young of a clutch were taken by children and a tractor ran over the nest in the sugar cane field.

Aggressiveness

While incubating, the bird is rather alert and looks all around moving its head, and also above, turning its head up. It was especially alert and somewhat disturbed when one or four Black Vultures *Coragyps atratus* soared above the area and once at a soaring Crested Caracara *Polyborus plancus*. On 14th August one bird was incubating and suddenly it stood

up and walked over to a pole half a metre from the nest and stayed immobile there. Soon after, I saw the shadow of a vulture circling the nest. The bird seemed disturbed for a moment and was immobile but preened a little and three minutes later the vulture went away.

Once, on 14th August 1982 at 10:40, a bird flew off scaring away two Campo Flickers *Colaptes campestris*. On 13th August 1982 at 16:45 when three foraging Guira Cuckoos *Guira guira* approached on the lawn, an adult near the nest returned running toward the intruders which moved away with *tee tee tee* calls. The adult lapwing returned to nest soon afterwards.

The birds are aggressive all year long toward other birds and humans passing by: this is evident by their loud calls and running movements and a few displays toward intruders. This is especially so when they have a nest or chicks which they defend fiercely, for instance when I was measuring and weighing young, my husband was standing being attacked by both adults in flight and diving toward him and actually hitting him with a wing spur.

Whenever a bird is sitting on a nest or on a mound, if someone passes it stands and resumes foraging and pecking the ground intently. 'Active foraging' or 'diligent preening' may be types of aggressive behaviour toward a predator. At the presence of two dogs 80 m from the nest, a bird left the nest and stood preening at the edge of the hill.

An immobile bird is hard to see in the middle of burnt stubble which is also grey like the bird's back. Thus, the alternating immobility, preening, walking slowly and cautiously may be a means of concealment when they really have nests or chicks. However, this behaviour seems more pronounced during their breeding season.

Parasites

While incubating the birds preened a lot and often half stood to preen the wings, back and breast; they seemed to be irritated and perhaps they and the nest were infested with mites.

Foraging

On 16th August 1982 at 08:32 an incubating adult ran from the nest to peck a flying moth. Most of the time they peck on the ground for insects amongst the grass but sometimes one is observed inserting the bill in the wet grassy ground and digging out worms.

Hatching young

On 17th August 1982 at 10:41, when I suspected there was a chick in the nest, the adult was half standing in the nest; it turned the eggs and

at. Its mate was 5 m north of the nest. At 10:58 the sitting bird stood again, turned the eggs and soon pecked the ground twice and went 40 cm away from the nest and preened a lot. At this moment, the chick moved in the nest. At 11:04 the adult returned to nest and sat with the chick under its breast. Between 11:04 and 11:56 there was a change of adults on the nest at 11:31 and 11:55; at 11:56 the sitting adult stood up and walked straight ahead with half an eggshell. It dropped the shell 0.5 m from the nest and, turning to face the nest, it picked the eggshell up and, half dropping it, scattered fragments along as it walked to 15 m away, eating some fragments in the process. The parent returned to the nest, picked up the other half of the shell, and walked with large strides to about 18 m SW of the nest. There it scattered and ate the pieces in four minutes. It was back to the nest at 12:05. At 12:20 two eggs, which weighed 21.5 and 21.0 g, were pipping at the large end. The newly-hatched young weighed 17.3 g; it had black swollen feet and was mottled on its wet back and head; its eyes were brown. It gave faint peeping calls, had a white eggtooth, and was white on the belly and neck but had a black band across the chest. Its bill measured 1.1 cm.

While we measured and weighed the young, another egg hatched and the young weighed 19.2 g, peeping with eyes half open. The bill was 1 cm long. At 14:30 the third young was hatching but the yolk was still stuck to the shell and the young was wet. The first-hatched young was quite dry and the second one rather dry. The fourth young hatched at 10:24 on 8th August, when the adults were downhill with three other chicks. At 10:36, after some commotion and screeching, one adult ran to the nest, lifted an eggshell and carried it away, dropping it once in a while and leaving it 30 m from the nest. It then returned to the nest and sat briefly.

Young

The young crouch as soon as they hear the adult screeching at a possible danger. Their downy plumage is mottled in dark and light, inconspicuous in the middle of low vegetation. A few hours after hatching they run out of the nest, hurrying back to the nest or hiding under the parents as soon as there is any danger.

On 26th August 1982, at 18:09 chicks were still running to the centre of the football field, between two parents. At 18:14, when it was rather dark, one bird settled near the nest site and the chick ran to hide under it. At 18:18 it was dark already; the other birds seemed to sit at the nest site but it was too dark to be sure.

On 6th September 1982, the two remaining young were still tiny but black-chested. They wandered up to 35 m away from adults and foraged in the 'pause-run-peck-pause' fashion, but hid below the adult at a sign of

danger. With two young, each parent was caring for one young.

On 23rd September 1982, the chicks ran like adults on the field. About one-third the size of the adults, they were getting some feathers. On 1st October, young were about the size of a Semipalmated Plover *Charadrius semipalmatus* and had black chests, white bellies, grey heads, grizzled superciliaries with some black on the eyeline, and crest and brown backs streaked with grey.

On 11th November 1982 the pair at a new nest had two juveniles with them, probably young of the first nesting. Bills were shorter than those of adults and the back feathers had a banded or scaled appearance. The plume behind the head was short and the legs were light reddish or pink. Those juveniles were sitting close together on a mound of sand and grass cut by a tractor, but 7 m away from the new nest. They readily stood and started a long preening session when people passed only 15 m or so from the nest.

Milleo-Costa (1985) reports three individuals '.....participating in the nesting, using displays and stereotyped sounds which characterise interspecific agonistic behaviour by attack', but this was not seen in the Rio Claro nests, except that two juveniles were sitting near a nesting pair.

On 19th August 1982, when I tried to weigh the four chicks, one bird started to screech loudly and a pair flew after me, thus I presume the first bird was part of that 'family'. This third member was only noticed when the chicks were born.

After breeding ends, the Lapwings flock and can be seen in loud groups of 8-10 flying over the city. Flocks of four can be seen even of nesting pairs.

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FURTHER NOTES ON CHUKAR AND HYBRID PARTRIDGES IN BRITAIN AND EUROPE

By DEREK GOODWIN
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In my article on *Alectoris* partridges in a recent issue of our magazine (Vol. 92: 1: 22-36) I touched on the introduction of the Chukar *Alectoris chukar* into Britain and Europe and the disastrous effects this seems likely to have on the future status of the Red-legged Partridge *A. rufa*, both in England and in its native home in south-western Europe, and on the Rock Partridge *A. graeca* in Europe. I mentioned that I had not myself seen hybrid *chukar x rufa* partridges and therefore could not give a description of them. I have since done so and also received further information on the introduction of the Chukar in Europe. Hence this short article as a sort of postscript to my former one.

Appearance of hybrids

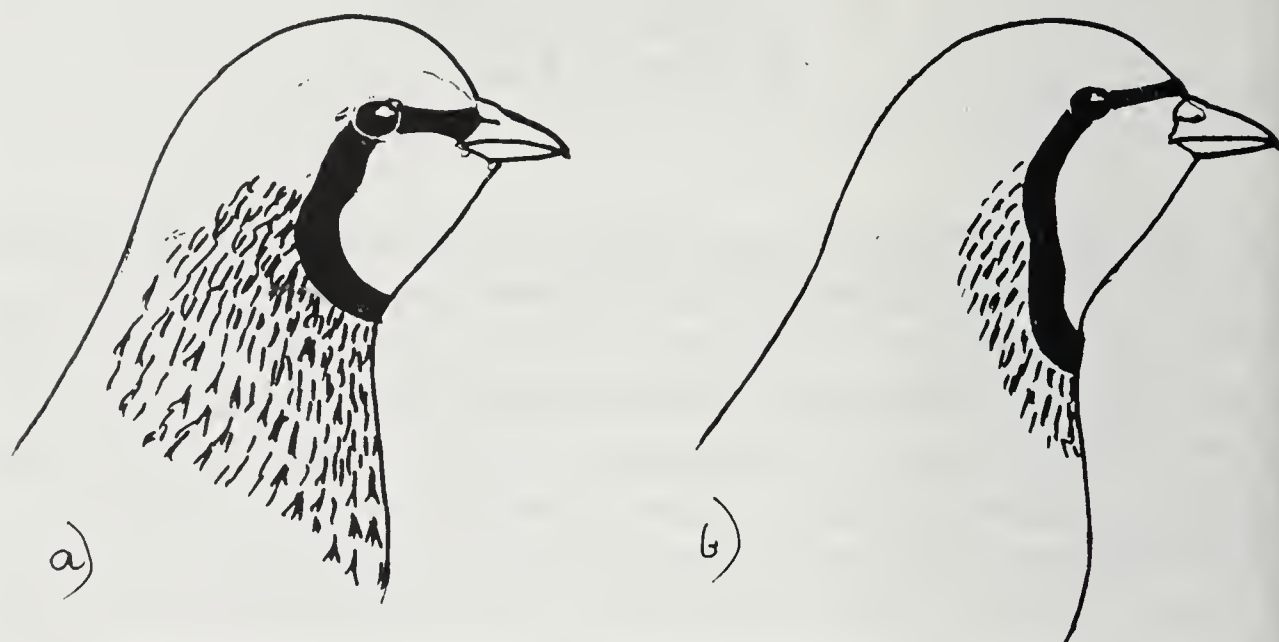
In the past 12 months I have seen about 20+ hybrid *Alectoris* in two different areas in Kent. In the same period and places I have seen only three that were, *in appearance*, pure Red-legged Partridges, and two that appeared to be pure Chukars. A few other *Alectoris* were seen at too great a distance to ascertain their status.

Whether these hybrids had been bred in captivity and then released or had been bred in the wild I do not know but, as the majority of them were where I had seen mixed pairs in the spring of 1985 (Goodwin, 1986) the latter seems likely.

Most of the hybrids seen appeared 'in the field' to be closer to one or other parent form and, by the casual observer, could very easily have been assumed to be pure *rufa* or pure *chukar* as the case might be. The intermediate condition of the neck markings, however, at once revealed their hybrid status to one looking out for this. All showed some trace of the streaked 'necklace' of the Red-legged Partridge, varying in amount, never as much as in pure *rufa* but always sufficient to tell them from pure *chukar*.

It is, of course, quite likely that some hybrids, especially if they result from back-crossing of a hybrid to one of the parent species or from hybrids breeding *inter se*, may have the neck pattern identical or nearly so to one of the parent species and that I (and others) may not recognise such birds as hybrids when seen in the field.

Unless a very clear and close view is obtained, other specific differ-



D. Goodwin

Diagrammatic sketches to show differences in pattern of face and throat of: a) Red-legged Partridge; b) Hybrid Chukar x Red-legged Partridge (drawn from photograph taken in 1986 near Abberton, Norfolk).

ences are hard, perhaps impossible, to ascertain in the field. My friend Mr Michael Cettrell took some colour photographs of a pair of *Alectoris* (near Abberton, in Norfolk) that appeared in the field to be Red-legged Partridges except for the lesser amount of streaking on the neck. When, however, we looked at the resultant photographs in detail, we found that in two characters - the distribution of white and black on the face and the shape of the bib - they took after the Chukar. One of these birds has one flank feather fully exposed and this feather (probably also the others) has two black cross-bars, as on a Chukar, although, in the amount of chestnut at the tip it (and all other flank feathers of both birds) more resembles the Red-legged Partridge.

Pairing of hybrids in the wild

In the spring of 1986 I was able to see only three pairs near enough to ascertain their status. Near Farningham, Kent, I saw (on two different occasions but almost certainly the same two pairs) a pair consisting of two very similar (and very 'intermediate') hybrids and another pair in which the cock looked a pure Red-legged Partridge and the hen was a hybrid. Near Cliffe I saw two hybrids paired together, one of which was nearer to *rufa* and one to *chukar* in general appearance.

More on introductions

Thanks to Dr Jurgen Nicolai, who very kindly sent me copies of the relevant literature, I have now learnt more about the introduction of the Chukar in Europe. None of it comforting for those who, like myself, hope for the continuation of the Red-legged and Rock Partridges in their pure state. It would appear (Glotz von Blotzheim 1973; Niethammer, 1963) that the liberation of vast numbers of Chukars in southern France and elsewhere in Europe was (and I suppose still is) not or at least not only at the whims of individual shooters and landowners but (so I deduce from the information given by Niethammer) by or under the auspices of an international shooting organisation, the 'Conseil Internationale de la Chasse', with at least the tacit approval of the governments of the countries concerned. Readers may be glad to know that our late member Professor Ghigi appears to be one of the few eminent ornithologists who was courageous enough to speak out against these plans to introduce the Chukar into the native haunts of other *Alectoris* species. As early as 1957 (or before) hybridisation between Chukars and Red-legged Partridges was taking place in France. A statement that the hybrids were also fertile suggests that they were also then freely breeding there in the wild.

It thus seems likely that it is official, or at any rate quasi-official policy to try to eliminate the Red-legged Partridge in France (possibly also in Spain) in favour of the Chukar and/or hybrids between the two. Even if not, there, as of course in England also, the combination of *non-selective* shooting by sportsmen, coupled with continual 'topping up' with fresh releases of Chukars could hardly fail to result in the ultimate disappearance of pure Red-legged Partridges. Unless (1) more *Alectoris* partridges were killed by other factors than by sportsmen *and* (2) these other adverse factors caused strong selection for *rufa* and against *chukar* and hybrids. Which seems unlikely. Rather similar circumstances (apparently non-selective mortality factors coupled with 'topping up' by man) have resulted in the racial mongrelisation of the Pheasant *Phasianus colchicus* in Britain and the replacement of wild Rock Pigeons by feral pigeons in much of Britain.

I had thought that the introduction of the Chukar and its hybrids into Britain had been done by individuals at their own free will. Now, of course, the suspicion occurs that there may have been official pressures in response to orders from the EEC authorities in Brussels. That the latter long ago decided that it should be illegal for people in member countries to grow and market more than a relatively few, officially approved cultivars of fruits and vegetables is well known, for there were many published protests from scientists involved in horticulture and agriculture. If, as

seems all too possible, our masters in Brussels are persuaded that all other forms of *Alectoris* are 'inferior to' and 'poorer sporting birds' than the Chukar and are to be eliminated in favour of it, then the outlook is bleak indeed. Certainly the large scale introduction of the Chukar into Britain seems to have coincided in time with our joining the EEC but whether it is, as I fear, a case of *Post hoc ergo propter hoc*, I do not know.

If the EEC authorities are behind the Chukar introduction project then, obviously there is no hope for the future of the Red-legged Partridge now that Spain and Portugal, as well as ourselves, are subject to their rulings. If not, then it seems to me that the best way to save pure stocks of the Red-legged Partridge would be to ascertain if any of the islands where it occurs (probably mostly as a result of past introduction but that is unimportant), the Balearics, Corsica, Gran Canaria, Madeira and the Azores, are as yet free of Chukars and/or hybrids. If, happily, some or all of these islands were found to be free of *Alectoris* other than *rufa*, then every effort should be made to make it illegal to introduce any other *Alectoris* species into the wild on them.

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REDUCING EXCESSIVE WEIGHT LOSS IN A WHOOPING CRANE EGG BY REHYDRATION

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Introduction

Assuring the proper rate of evaporative water loss is essential in the artificial incubation of wild bird eggs. This article describes an example of excessive water loss from a crane egg and successful attempts to correct it.

A female Whooping Crane *Grus americana* (I.D. No. 13-01) laid one egg at 15:00 h on 3rd May 1982 at the International Crane Foundation (I.C.F.) at Baraboo, Wisconsin. The egg, weighing 207.11 g and measuring 108.4 x 60.2 mm, was immediately placed in the nest of a pair of Florida Sandhill Cranes *G. canadensis pratensis*, in an open area of an outdoor enclosure. On 14th May the egg was temporarily removed to be weighed and candled. The fertile egg had shown a daily weight loss of 1.96 g/d which would have resulted in a predicted weight loss of 27.5% over the entire 29-day incubation period (Fig. 1). Artificially incubated crane eggs that subsequently hatch ordinarily lose 10-16% of initial weight during incubation (Rogers, 1982). The total weight loss of many bird eggs during natural incubation is 16-18% (Drent, 1975; Rahn and Ar, 1974). Snyder and Birchard (1982) found that hatchability of chicken eggs is inversely proportional to final weight loss above 15%. They also report that excessive rates of water loss during the first half of incubation are more detrimental to hatchability than the same rates of loss during the final half.

Methods

Several methods were employed attempting to slow the daily weight loss of this egg. The egg was returned to the nest, which was artificially moistened. The incubating birds were provided with a plastic wading pool for bathing, and the nest was moistened with water each day. On 21st May the egg was weighed again and still showed excessive loss (1.94 g/d). The egg was then placed in a forced-air, automatic egg-turning incubator with a dry-bulb reading of 37.6°C and a wet-bulb reading of 30.2°C. The wet-bulb reading was increased to 33.3°C by 24th May and then maintained between 33.3-34.4°C until 31st May. From 21st to 24th

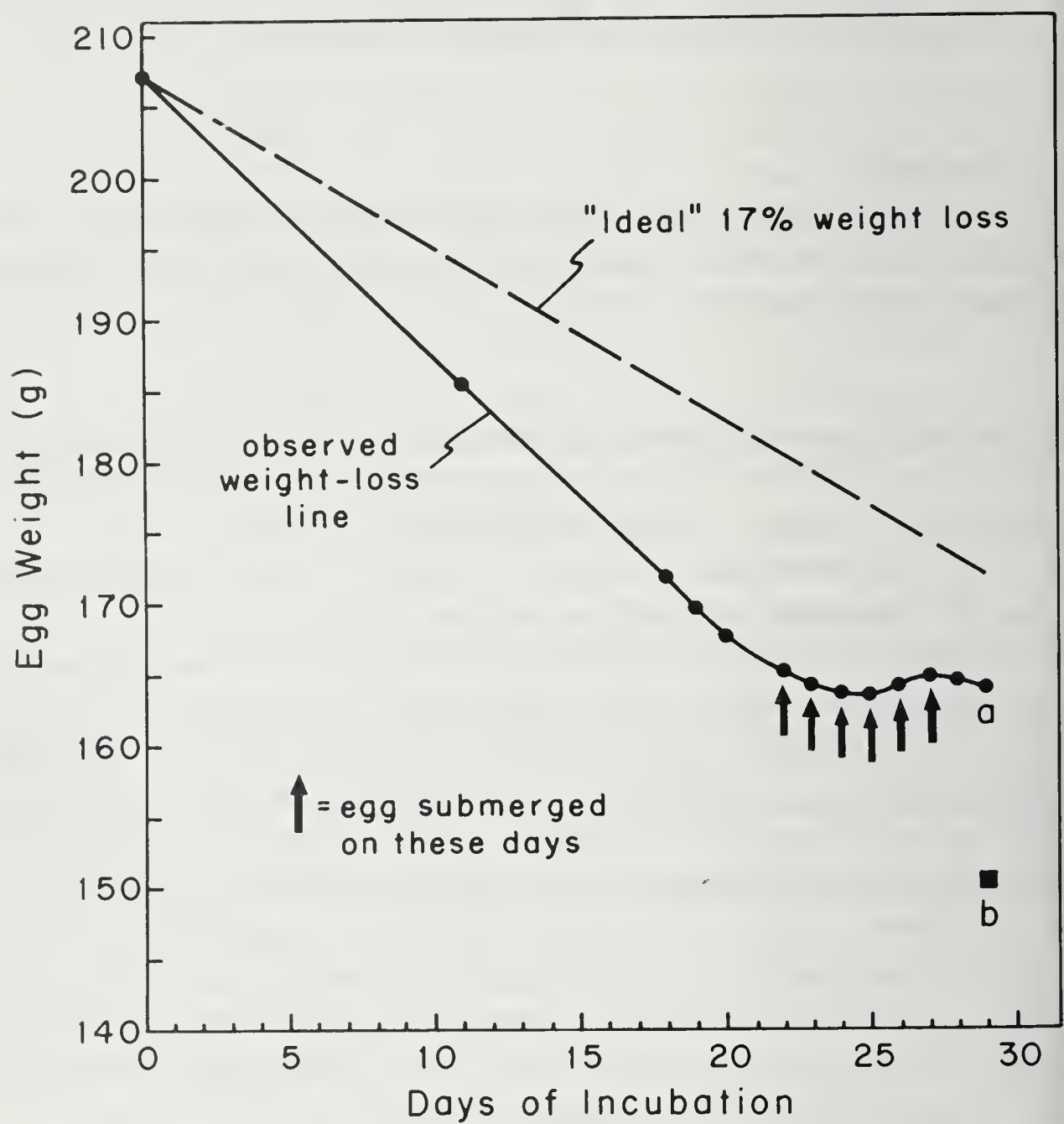


Fig. 1. Daily weight loss from a Whooping Crane egg during incubation.

a) Final weight loss at hatching of 21%

b) Projected final weight loss of 27.5% based on a linear regression of weights from days 0-20.

May daily weight loss remained high (2.10 g/d) despite increased ambient humidity.

On 25th May the egg was removed from the incubator at a temperature of 37.6°C and *completely* submerged in a 0.9% saline solution containing 3000 ppm of tylosin tartrate (trade name Tylan Soluble) at 4.4°C for five minutes in an attempt to restore some of the lost water. This method has been used widely in the poultry industry to introduce antibiotics into hatching eggs early in incubation since its demonstration by Chalquest and Fabricant (1959). The egg was gently blotted with a towel, allowed to dry and then weighed again. Five-minute submersions were continued daily through 30th May using sterile tap water cooled to 10.0°C in place of the Tylan solution. The high incubator humidity was maintained through the end of incubation.

On the morning of 30th May the egg was removed from the rotating tray and set in a concave piece of foam rubber on the incubator floor. The egg was candled, and the larger portion of the air cell was kept uppermost. By 22:00 h the chick could be heard scratching inside the shell. By 08:00 h on 31st May, the chick had torn the inner shell membrane and was breathing and peeping loudly. The egg was then transferred to a forced-air hatcher set at 37.2°C with a wet-bulb reading of 34.4°C. Egg submersion was discontinued so as not to drown the chick. The chick pipped the shell by 08:00 the next day. The hatching sequence did not progress beyond this, and at 15:00 h an aviculturist opened the shell further. The chick freed itself from the shell at 18:40 h. Ten measurements of shell thickness, including the dried membranes, were taken around the midsection of the egg with a micrometer.

Within a week of hatching the chick became lethargic. The bird was treated with antibiotics and force-fed and soon recovered.

Results and discussion

Our attempts to correct the excessive weight loss were unsuccessful until we began submerging the egg. The weight loss was not only stabilised by this treatment, but the egg actually gained weight (Fig. 1). Total weight loss to the end of incubation was 21% as opposed to the estimate of 27.5% (Fig. 1). Placing the warm egg in the cold solution produced a negative pressure and drew the Tylan solution into the egg. Continued use of the saline solution beyond the initial submersion might have resulted in toxic build-up of salt inside the egg as 6-10 mg of salt may have entered the egg with each submersion. The prophylactic Tylan treatment safeguarded against bacterial infection. After the egg had dried, weighings indicated an average gain of 0.885 \pm 0.199 g (\bar{x} \pm SD, $n = 6$) from each submersion. The weights recorded on Fig. 1 during the submersion treatment are those

recorded each morning *before* submersion. The corrective measures used by Burnham (1983) for falcon eggs, such as covering parts of the shell surface with paraffin or injecting Ringer's solution, were unknown to us at the time.

After hatching, the eggshell thickness was found to be 0.485 ± 0.050 mm ($\bar{x} \pm 95\%$ CL, $n = 10$). Anderson and Kreitzer (1971) give Whooping Crane eggshell thicknesses from eggs collected before 1910 as 0.604 ± 0.14 mm (not 0.064 ± 0.014 , as given in their Table 1 [D.W. Anderson, pers. comm.]) and 0.612 ± 0.057 mm ($\bar{x} \pm 95\%$ CL) for eggs collected from 1967-1969. These figures suggest our captive-produced egg was relatively thin-shelled. This thinness may have been partially responsible for the excessive weight loss of the egg, since water vapour conductance across eggshells is inversely proportional to shell thickness (Ar, et al, 1974).

We feel that this method of repeatedly submerging eggs may be useful in reducing excessive rates of weight loss in artificially incubated eggs. From our limited experience it appears that this technique can be used in later stages of incubation and on a daily basis.

ACKNOWLEDGEMENTS

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Tylan Soluble. Elanco Products Co., 740 S. Albama, Indianapolis, Indiana 46285, USA.

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BREEDING THE WESTERN SPINEBILL

Acanthorhynchus superciliosus

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Description

The Western Spinebill is found in the south-west region of Western Australia; the only other member of the genus is the Eastern Spinebill *A. tenuirostris* found in the eastern region of Australia from Queensland to Victoria and on Tasmania and islands of the Bass Strait. Spinebills are closely related to the honeyeaters.

The male Western Spinebill is dark olive grey above and has a broad chestnut collar over the nape, extending to chestnut throat and breast. There are white and then black bands across the breast; the abdomen is buff. Length 13-16 cms. The female is smaller, duller with no chestnut on the throat. It lives on heathland and woodlands where it feeds on Kangaroo Paw *Anigozanthos manglesii* and other flowers, Dryandras and Banksias and insects on the wing.

History

Both the male and female were wild-caught birds, the male probably arriving at Perth Zoo in early 1976 whilst the female arrived in December 1978. Both birds have had a history of recurring scaly feet which prevented us from banding them.

They were originally housed in an aviary that contained a pair of Black-tailed Native Hens *Gallinus ventralis* and a Little Bittern *Ixobrychus minutus*. Two small shrubs covered by a creeper grew over a concrete pond located in the middle of the aviary.

A small, cup-shaped nest was built in the creeper in November 1983 and one egg was laid. However, unseasonably bad weather caused the female to lose both the nest and the egg a day after she began to incubate.

In August 1984 both birds were moved to another aviary which had been relandscaped along with several surrounding aviaries under a general theme of 'forests'. The aviary measures approximately 3m high x 4.5 m inside and faces south-west. It has a sandy floor and is covered with tin on its northern side. Vegetation in the aviary includes two types of Bottlebrush *Callistemon* an Albizzia *Albizzia lophantha* and several types of native grass, as well as a number of Kangaroo Paws *Anigozanthos manglesii*. A sawn-off branch from Weeping Peppermint Tree *Agonis flexuosa* is propped up in a corner of the aviary.

Birds of Western Australia (Serventy and Whittel, 1976) states that eggs and nests can be found from September to January, with early nesting birds usually having only one egg and later nesting birds having two. Eggs are buff with brown blotches, particularly at the larger end, and they measure 18 x 13 mm.

Observations

In late August 1984, three weeks after being relocated in their new aviary, the male was seen displaying to the female. He would approach her from a lower point of the branch upon which she was sitting and take a small hop towards her while fanning his tail exposing his conspicuous white outer tail feathers. The female would then fly off being closely followed by her mate who would chase her vigorously around the cage. The roles were often reversed with the female doing the displaying and chasing. During the displays the male in particular was very boisterous, calling loudly all the time.

The female soon began constructing a nest, often carrying long strands of grass around the aviary for several laps before alighting on a branch. Construction took 4-5 days and was carried out by the female only. She used Albizzia flowers and dried grasses, as well as camel hair, coconut and palm fibres, and spiders' webs which were provided for her, hung in the bottlebrushes. The nests of a Singing Honeyeater *Melophaga virescens* and a Striped Palm Squirrel *Funambulus pennanti* were also torn up and provided as nesting material. The nest was built about one metre off the ground in the peppermint tree and was lined with feathers and camel hair.

An egg was soon noted in the nest, and the female began sitting the day after the egg was laid. The male was seen to fly to the tallest branches where he would sing loudly; on occasions he was seen to feed the female with insects that he had caught.

The diet fed to the birds consists of a nectar mix (2 parts Complian, 2 parts honey, 1 part mixed cereal, vitamin drops), minced and diced beef heart, fruit and flowering plants and an egg mix as follows:

- 6 parts dried egg yolk powder
- 2 parts skimmed powdered milk
- 1 part ground wheat
- 1 part wheat germ
- ½ part fish meal
- ½ part yeast
- 1 part casein
- ½ part S.A. 37 (vitamin compound)

½ part peanut oil
1 part honey
5 parts water

A lorikeet diet consisting of honey and mixed baby cereal, Compland and fruit, blended together, was added soon after incubation began, being offered in a small cup hung in the Albizzia. Mealworms were offered initially but the birds showed no interest in them. One of the Bottle-brushes began to flower when the birds went to nest, the profusion of blossoms resulting in many winged insects flying into the cage which the male hunted with vigour.

The female left the nest two to three times a day to feed and on one occasion was seen to fly around the aviary with a white feather in her bill, with the male following behind singing loudly.

Sixteen days after the egg was noticed a chick was observed in the nest late in the afternoon as the female left to feed. She returned quickly to the nest and continued to incubate.

The following morning she was off the nest and a quick inspection revealed that the chick had died overnight.

The male was soon chasing the female around the aviary relentlessly. Later in the day she was found in a weakened condition on the ground, still being harassed by the male. Some nectar mix was provided for her behind a small tussock of grass and she drank from it with relish. A small branch from a peppermint tree was provided for her in a corner to give her some refuge from the male.

The next morning the female had fully recovered and the male was returning to the nest and looking into the cup as if trying to feed the dead chick. Because of the male's persistence in returning to the nest and his aggressive behaviour towards the female, it was felt that the nest should be torn up so that they would be encouraged to start nesting again.

Within a few days, construction of a new nest began in a similar position to the old one. Late one afternoon the female was found in a lethargic state on the aviary floor, after being harassed by the male once again. The nectar mix was again placed on the floor for her and she drank from it readily.

Construction of the second nest took about six days and it was three to four days before an egg was observed. The male did not mind nest inspections, but they were kept to a minimum and were only made after she had left to feed. A second egg was noted four days later.

In early October, with the increase in evening temperatures, a moth trap was set each night so that moths could be added to the diet. These were fed in the morning and afternoon and were distributed in bushes and

grasses with the hope that they would remain and not fly straight out of the aviary. The male quickly learnt this feeding routine and would wait near the aviary door before each feed, hovering over the bag of moths like a hummingbird.

The female added several large feathers to the rim of her nest which made it very difficult to tell, from outside the cage, whether she was sitting or not. However, she continued to leave the nest each time that fresh food was available. The male would often feed moths to the female after she left the nest.

On 15th October the nest was checked after 16 days' incubation and revealed the presence of a chick. The following morning the male was seen taking a small moth up to the nest while the female left to feed. The male spent most of the day off the nest and the method of placing moths in the bushes was proving successful with the male catching winged insects and taking them to the nest throughout the day.

The male was seen to catch small moths and pound them on a branch before flying to the nest to feed the chick; the female was observed to do the same.

Eggshells were found on the aviary floor three days after the first chick was observed and a quick inspection of the nest revealed a second chick.

The size of the moths being fed to the chicks was increasing and the male was seen to remove the less palatable head and wings, leaving only the soft abdomen. The chicks could be heard calling loudly as the female spent less time on the nest because of the warmer weather. Faecal sacs were deposited on the cage mesh by both birds, resulting in dozens of white lumps on the black wire.

One morning, about 19 days after hatching, one chick left the nest for about 15 minutes, returning to the nest for the rest of the day. The following day the chick left the nest again and was followed by its nest mate in the afternoon. As each day went by, both birds spent more and more time out of the nest. They were fed by both adult birds who would dip moths in the nectar prior to giving them to the chicks.

About six days after leaving the nest, in early November, one chick was seen drinking the nectar mix by itself. At this stage it was noted that the Albizzia plant was infested with aphids and ladybug larvae and adults. Although it was not observed, these may have been used in rearing the young Spinebills, along with the other winged insects offered.

By mid-November, both juveniles were independent of their parents. The male, however, continued to feed them moths that he had caught. The female was preoccupied with nest reconstruction. She was seen to add new materials for several days, and it was decided to move the juveniles to an adjoining aviary to prevent them from interfering with any further attempts

by the adults to nest.

Soon after the two juveniles were removed, the female went down to nest again, sitting on two eggs. Fourteen days after the eggs were first seen, eggshells were found on the aviary floor. One chick was successfully reared, the second egg failing to hatch.

As soon as the chick from the second clutch was independent, it was removed to another aviary with four juvenile Banded Wrens *Malurus splendens*. By late December 1984 the female was again sitting on three eggs in the same nest and after incubating for about 16 days, eggshells were found in early January 1985 on the aviary floor.

The male was once again diligent in catching moths and taking them to the nest where a chick could be heard calling. By late January the chick was old enough to leave the nest, and soon after doing so, the nest collapsed. It was then discovered that there were two dead chicks in the bottom of the nest, about 1-2 days old.

By late January it was obvious that the first three juvenile birds were all males, the black band across the breast becoming evident about 45-50 days after the birds fledged. The band becomes evident at the shoulders first, then spreads across the breast.

In early February all the juvenile birds were banded and the last juvenile, which was about 20 days old, was weighed (10 g).

On 11th February 1985 the breeding female disappeared. Her body was found two days later, hidden amongst the many grass tussocks planted in the enclosure. Because of decay, it was impossible to carry out a post mortem and the cause of her death is unknown. It is felt, however, that she died from exhaustion due to aggressiveness from the male. The female had been almost continually involved in the breeding cycle for nearly six months and must have been approaching exhaustion.

The male was relentless in his behaviour towards the female as he chased and drove her back to the nest after each clutch had fledged. After the nest collapsed, however, she could not return to it to escape the male's attacks. As a result, it is thought that she became progressively weaker over a short period of time and finally died.

In the future it is hoped that the experience gained with these birds will prevent the future loss of such a prolific breeding bird, and that with closer observation, pairs can be separated before such tragic losses occur. We hope to be able to obtain some new females prior to the next season's start and have them settled in with their mates so that we can continue, and establish a breeding programme for these attractive birds.

ACKNOWLEDGEMENTS

We would like to acknowledge the help of all the staff on the Bird Section of Perth Zoo.

Products mentioned:

Complan - Glaxo New Zealand Ltd.

Mixed Baby Cereal - Heinz Australia Ltd.

S.A. 37 - Brisfarm Vet Products Ltd., New South Wales.

Note: A detailed diary of these Eastern Spinebills' breeding record was kept which was too long to reproduce here but copies may be obtained from the Editor upon application with a stamped addressed envelope.

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* * *

NEWS AND VIEWS

Neville Brickell writes from the Natal Avicultural Society, South Africa to report on an excellent achievement by an Ashburton aviculturist Ken Arnold, who has recently bred the Cabanis's Bunting *Emberiza cabanisi*. This is the first recorded breeding of this species by an aviculturist in Africa. The date previously unknown to ornithologists and aviculturists alike is now given: incubation period 14 days; nestling period 16 days; the male plays no part in nest-building or incubation; the male fed the female on the nest; the preferred livefood was grasshoppers with the legs removed.

* * *

Mr. A.J. Mobbs writes: 'In June (1986) a UK newspaper reported the death, aged 70, of Augusto Ruschi in Brazil. It appears that Ruschi had had a recurring illness for some time after handling Poison Arrow Frogs.

'Ruschi was renowned throughout the world as an expert on hummingbirds. Over the years he wrote numerous papers on the Trochilidae. He also had a number of books published, many of which became collectors' items during his lifetime. *Beija Flores* was published in 1973 in a limited edition of 1,000, all signed by the author and was soon sold out. *Aves do Brasil* was published in 1979 and also was soon out of print. A second volume was published in 1981; a third volume was to be published, whether or not this will now appear, I cannot say. In 1982 *Beija-Flores do Estado do Espirito Santo (Hummingbirds of States of Espirito Santo)* was published. (Reviewed by the writer in the *Avicultural Magazine*, Vol. 89: 242-243).

'In preparation was *Hummingbirds of Brazil*. I have no idea if this will now be published.'

* * *

Malcolm Ellis writes: 'Richard Meyer, known to some members for his past work in aviculture - most notably at the Wildfowl Trust and Winged World (and several books written under the name Richard Mark Martin) is beginning a three-year doctoral research programme with the University of Glasgow examining the causes for the decline of the Chough *Pyrrhocorax pyrrhocorax* and its potential for re-establishment, possibly with captive-bred birds, on the cliffs of Cornwall: its final English

troughold on the south-western peninsula - and from where it died out earlier this century. This work will be carried out in liaison with all the major conservation bodies.

His work will focus on remaining wild populations in Ireland and Wales, where ecological requirements will be assessed and compared with available resources in Cornwall. Alongside comparative habitat and dietary analyses, Richard will investigate the possibilities for a fully integrated captive-breeding programme in which holders of this species will be encouraged to participate. The Padstow Bird Gardens on the North Cornish coast already has three pairs, and these will form the nucleus of the captive-breeding experiments and ethological studies.

In connection with this work and preparations for possible reintroduction, Richard urgently asks all aviculturists with an interest in this species (including past and present owners) to contact him either through the Department of Zoology, the University, Glasgow G12 8QQ, or at his home in Cornwall (Hillside Cottage, Hellandbridge, Bodmin, Cornwall PL30 4QR).

* * *

The Avicultural Federation of Australia has sent advance notification of their 1st International Avicultural Convention which is being hosted by the New South Wales Avicultural Council and will be held at The Central Coast Leagues Club, Gosford, N.S.W. from 10th - 13th April 1987. The theme of the Convention will be Conservation and the list of speakers includes several well-known members of this Society such as Robin Resall, Tony Silva and Charles Sivelle. The Council will be donating 80% of the profits to the establishment of a captive breeding programme for endangered avian species.

The Convention will be held in a beautiful setting and there are several interesting entertainments planned including a bird display at Old Sydney Town (a recreation of old Australia) that promises to be enormous including around 90% of all parrots kept in Australia.

We hope to include further information in a future issue but meanwhile if any members are interested in taking part, they should write to Tom Donald, Avicultural Convention Co-ordinator, P.O. Box 1296, Gosford South, New South Wales 2250, Australia.

INTERNATIONAL ZOO YEARBOOK, No. 23

Ed. P.J. Olney. Published by the Zoological Society of London, 1984.
ISSN 0074-9664. 395 pages text, 48 photographs, numerous diagrams
Price: £26.50 hardback, £19.50 soft back.

The twenty-third *International Zoo Yearbook* will be of particular interest to many of our members for the special section concerns birds of prey and reflects the diverse means by which current problems of breeding this group of birds, and their reintroduction to the wild are being tackled. Internationally distinguished authors have written 28 papers on this theme with subjects ranging from breeding the Andean Condor (London, New York and West Berlin), the American Bald Eagle and other species at East Berlin, and the first captive-bred Secretary Bird (Walsrode) to guidelines for rehabilitation of injured raptors (P.J. Llewellyn and P.E. Brain), discussion on the breeding and reintroduction of the Barn Owl (Caroline Brown) and many other interesting topics.

Members will remember the special issue of the *Avicultural Magazine* (1981, No. 4) devoted to birds of prey, which, for the first time in the journal's history, had to be reprinted owing to unprecedented demand. It is obvious that there is widespread interest and concern about the management and future of birds of prey and it is gratifying to read J.E. Cooper, in the opening article:.....'The opportunities offered by captive breeding must not be underestimated. As Cade (1982) has pointed out, the expertise now available means that no raptor species need ever become extinct. This is not the same as saving the free-living population but few, surely, would argue that it is better for a species to disappear than to survive only in a captive state'.

Section 2 contains 30 papers on new developments in the zoo world, under the headings of Breeding, Husbandry, Hand-rearing and Buildings and Exhibits. Only four of these concern birds - does this reflect lack of interest in birds in the zoo world, or inertia on the part of Curators of Birds in writing about their subjects? This inertia is not unknown to the Editor of the *Avicultural Magazine*!

Section 3 is a Reference Section covering species bred in 1981 and multiple generation births, a census of rare animals in captivity in 1982 and studbooks and world registers for rare species of wild animals in captivity. Author and subject indices to Volumes 22 and 23 conclude the section.

The standard of this publication is, as always, of the highest and this is a particularly interesting volume.

CORRESPONDENCE

Sir Allan Hume

I read with interest Mr. K. Dolton's letter (1986, 1:59), regarding Allan Hume and his Indian collection.

As far as I was aware, Hume never kept any living birds in India, and I believe that the reference to 62,000 birds refers to his collection of skins which was the greatest collection of Indian birds ever assembled by a private individual. In *The History of the Collections in the British Museum, Natural History*, R. Bowdler Sharpe mentions that the Hume collection was the largest private skin collection in the world at the time, consisting of over 60,000 bird skins and 16,000 eggs.

Regarding the naming of Hume's Bar-tailed Pheasant, Allan Hume noticed the tail feathers of the bird in the headdress of a native of Manipur territory. After much effort Hume was able to obtain a skin from native collectors, and a live specimen of the bird that was to be named Hume's Bar-tailed Pheasant. the name *humiae* was actually given to the bird in honour of Allan Hume's wife.

I hope the above might be of some interest to readers.

5 Chartfield Road,
Reigate, Surrey.

Alan Gibbard

* * *

Further notes on immature coloration of the Cape Parrot (Poicephalus robustus) and subspecies (P.r. suahelicus).

There seems to be a shortage of information available detailing the coloration of young Cape Parrots leaving the nest, and I felt that the following information gained through successful breedings in aviaries last year (1985) and close observation of immature specimens of *P.r. robustus* and *P.r. suahelicus* should be kept for future reference - particularly since there is one striking difference between the two on leaving the nest, apart from the depth of green body colour, dark green/olive colour in *robustus* and lime green with silver neck in *suahelicus* with a darker green back.

In my previous letter (1986, 1:56-57), I confirmed that, from a successful breeding of four young *suahelicus* (the Zimbabwean Cape Parrot), all the young of both sexes leave the nest with a large round crown of

orange/pink feathers, which are later moulted out in the first moult or at around six to seven months old. At around eight to ten months old, one can easily sex the young, for the hen birds then regrow their orange/pink feathers starting at the base of the top mandible - meanwhile the crown of orange/pink feathers on top of the head has disappeared. The young cock birds do not regrow these orange/pink feathers but sometimes retain a few orange/pink feathers on the crown of the head for a little longer. The adult cock bird, of course, has no orange or pink feathers on the head, thus making identification of the sexes very easy. The four young that were bred at Mitchell Park last year have moulted out to be two cocks and two hens.

Now the reverse is true of the South African Cape Parrot *P. robustus*. A colleague from the Cape, Melvyn Reabow, who reared two young *P. robustus* last year, advises me that both the young left the nest with no coloration on their heads at all, but at approximately six months old one bird grew orange feathers (as apart from the orange/pink crown of *P. suahelicus*) starting from the top mandible; the other did not, thus confirming that they are a cock and hen.

Thus, to summarise a strange deviation in the immature coloration of the two subspecies, all immature *P.r. robustus* have no coloration on the head on leaving the nest but all immature *P.r. suahelicus* have a large round distinctive crown of orange/pink feathers.

It is fair to point out that the adult hen *suahelelicus* has a far larger coloration above the top mandible than the hen *robustus*, and it is orange/pink (cerise) in colour, but a distinctive orange only, in *robustus*.

Mitchell Park Aviaries
Durban, South Africa.

W.D. Cummings

* * *

ust published (October 1986).....

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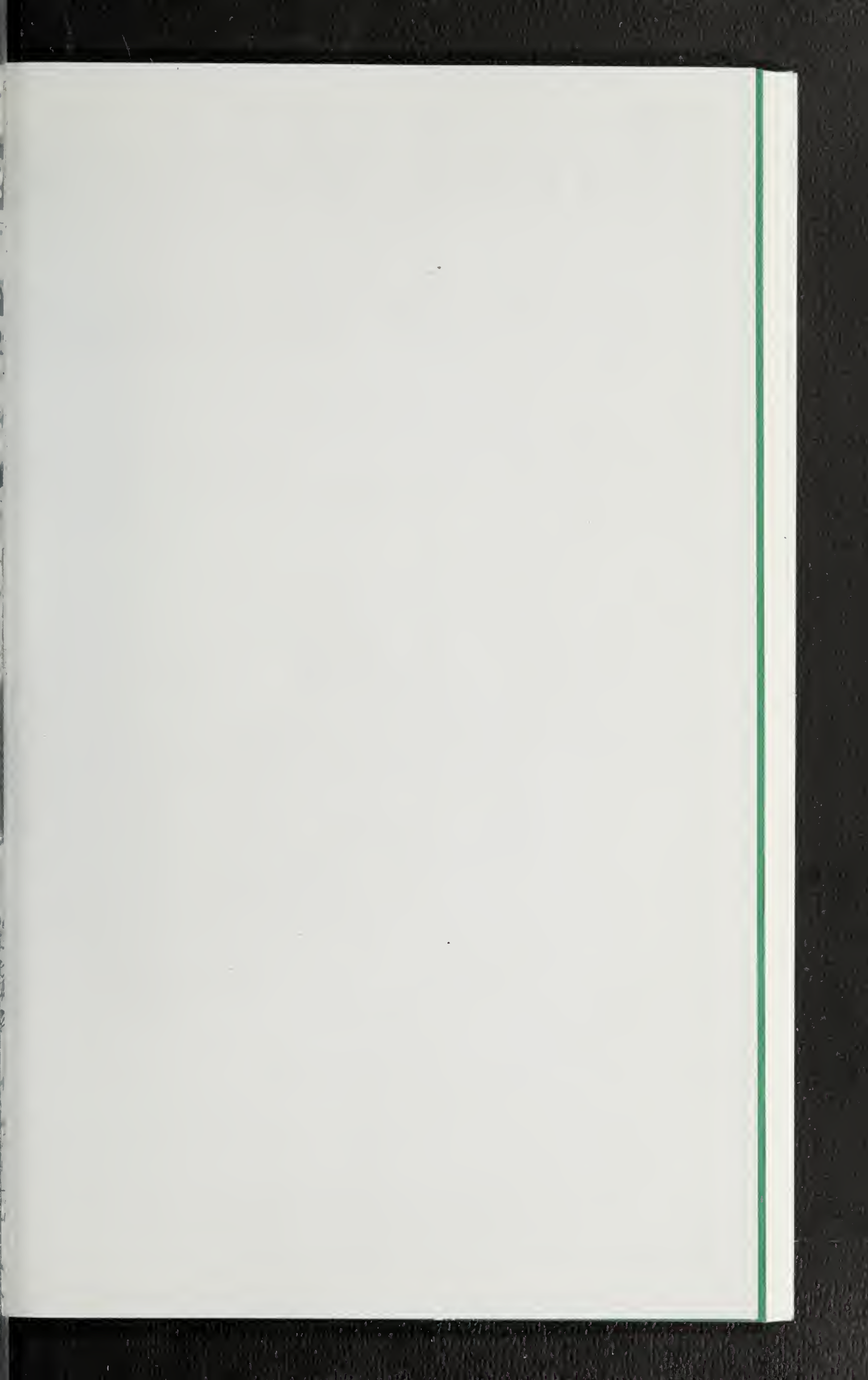
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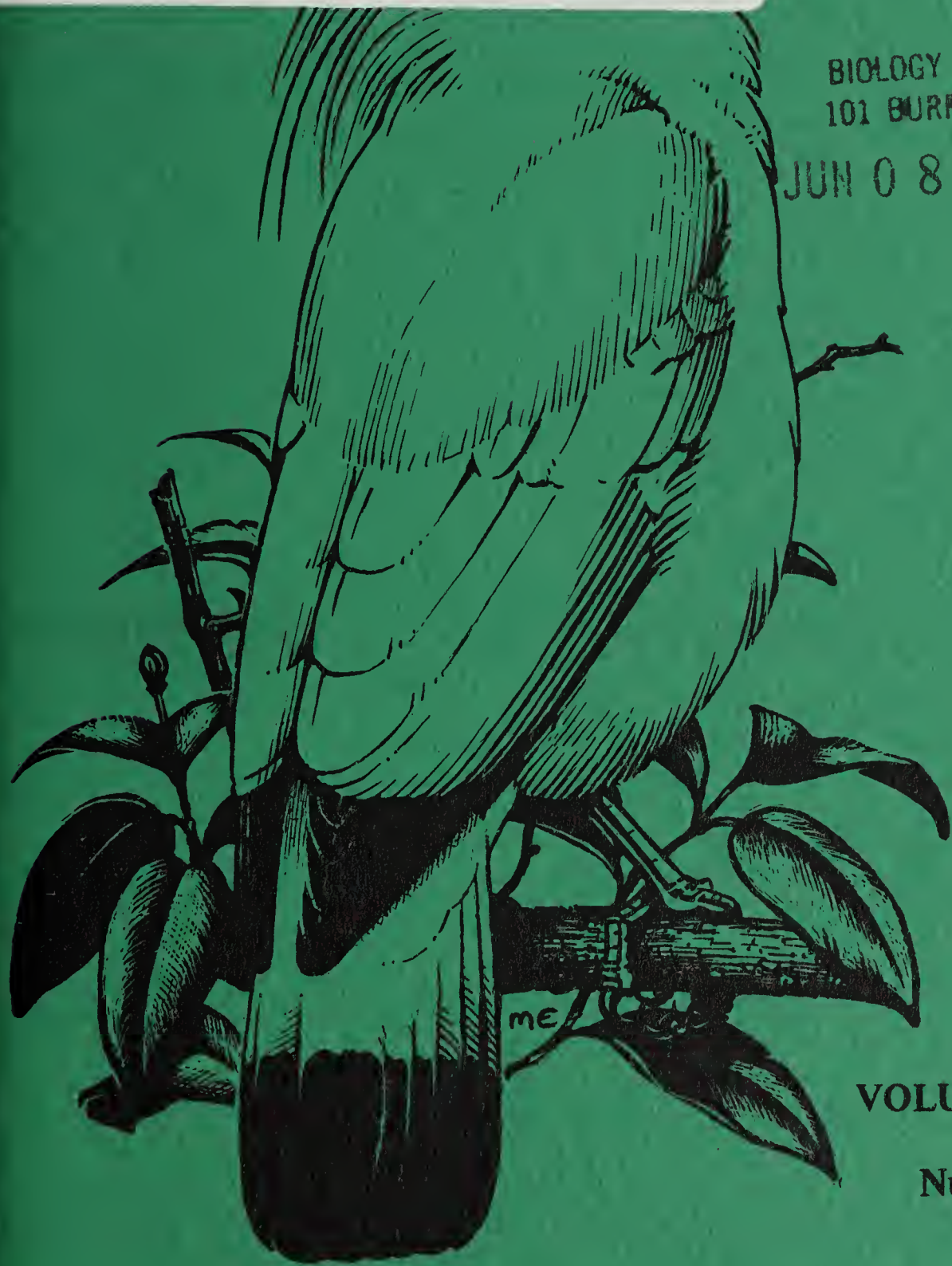
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ADDRESS OF EDITOR

Mary Harvey, Honorary Editor, The Avicultural Magazine, Warren Hill, Hulford's Lane, Hartley Wintney, Hampshire RG27 8LG, England



Rod Elgar

Young Peruvian Brown-bellied Amazilias
(above) Being fed by female at 24 days old: (below) just before leaving the nest

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NOTES ON THE SUCCESSFUL BREEDING OF THE PERUVIAN BROWN-BELLIED AMAZILIA

Amazilia a. amazilia (Lessons)

By ROD ELGAR
(Manchester)

Range and distribution

The Brown-bellied Amazilia is one of the most common humming birds of the coastal area of Peru, from Huacho and Sayan in the north to Pesco and Ica in the south. It prefers shrubbery and wooded terrain on the coast and low Andean slopes but can also be found in the parks and gardens of Lima.

Description

The birds in my collection were probably collected within the department of Lima and both male and female have glittering green throats. Birds from the more southerly part of their range tend to have more of a blue-green throat.

Male: upperparts bronze-green, throat and upper breast glittering green, belly chestnut, under tail coverts white, tail rufous edged bronze and white centre to breast, white thighs and ocular spot, bill flesh coloured tipped black.

Female: same as male but with greatly reduced white centre to breast.

Housing and method employed in this breeding

The male Amazilia was housed in a stock cage, 3 ft long (0.91 m) by 16 in (0.41 m) high and deep.

The female was housed in a mixed flight of mainly female humming birds. The flight measured 14 ft (4.27 m) long, by 4 ft (1.22 m) wide by 6 ft (1.83 m) high, being well planted with potted house plants. The other occupants of this flight were females of the following species: Fork-tailed Woodnymph *Thalurania furcata*, Chestnut-breasted Coronet *Boissonneaua matthewsii*, Tourmaline Sunangel *Heliangelus exortis*, Bronze-tailed Comet

Polyonymus caroli, Long-tailed Sylph *Agelaiocercus kingi*, Green-throated Mango *Anthracothonax viridigula*. There were two males, one being a Many-spotted Hummingbird *Taphrospilus hypostictus* and the other a Speckled Hummingbird *Adelomyia melanogenys*. Neither of these males has been moulted in captivity, but once they have completed their first moult they will have to be caged as both of these species can be rather aggressive.

If pairs of hummingbirds are kept together continually, this usually has a negative result on their breeding activities through continual aggression. If only females are housed in the flight and a female becomes broody, a male of her species can easily be introduced. I usually leave the male in for only one hour in the morning before leaving for work, then again for one hour in the evening before returning him to his stock cage. I usually try to observe display and copulation. I carry on this procedure until the nest is completed and the eggs have been laid.

Display

The female enters the male's territory in a slow, floating, butterfly-like flight. She perches close to the male making a loud piping call. The male approaches the female making a pendulum-like display before perching next to her, touching her by her gape with the tip of his bill and uttering a low bubbling song. He will open and close his wings at a 45 degrees angle in very exaggerated movements almost like a man using his arms for semaphore. The male then flies over the female and lands on the other side of her and continues with this display. The female will then usually fly over the male and land on the opposite side of him. Then the male will fly over her and land on the other side of her. This display can carry on for several seconds. To watch the birds making progress along the perch is like watching children playing leapfrog. During this display the male usually alights on the female's back and mating takes place. On some occasions the female may land on the male's nape or back to stimulate mating and false mating takes place.

Nest-building, incubation and chick development

The genus *Amazilia* is probably one of the most successfully and easily adaptable of hummingbirds in the wild. These birds will breed all year round when conditions are suitable and only cease when moulting. The female *Amazilia* in my collection can finish a complete nest in five days preferring to use natural cotton wool as the base to the nest, bound with fresh cobwebs. They will add small pieces of dried leaves and rootlets to the exterior of the nest. The nest where the chicks were reared was built in a *Heptapleurum arboricola*. During the nest-building the female was ob-

served eating soil-based compost from plant pots in the flight.

Extract from my diary

3rd September. 7.00 a.m. - female lays first egg.

5th September. Observed female lay second egg. She was perched on rim of nest whilst laying the egg into the cup of the nest. This appeared very stressful and she was visibly shaking.

After egg was laid she slumped forward still holding on to the rim of the nest with bill pointing to the ground. She stayed in this position for several minutes until she composed herself, then flew off to feed.

Incubation proceeded with nothing out of order happening. On 20th September I was getting concerned that the eggs had not started to hatch but at 8.00 p.m. one chick hatched, 18 days from first egg being laid.

21st September - 7.00 a.m. - first chick still alive and being fed.

9.00 p.m. second chick just hatching 17 days after second egg being laid.

25th September - Both chicks are developing well.

30th September - Pin feathers showing on both chicks, younger chick has almost caught up with the older chick in size and development.

2nd October - Eyes are almost completely open. Both chicks are feathering up well, flight feathers starting to open; female stops brooding chicks.

7th October - Both chicks are now well-feathered and look like little birds, both very active in the nest.

10th October - Older chick seen on rim of nest for short periods throughout the day.

12th October - Both chicks on rim of nest in morning exercising wings throughout the day. They both sleep in the nest at night.

13th October - Both chicks fly from the nest in the morning, very unsteady when perching.

14th October - Female feeds chicks normally throughout the day. Both chicks roost in plant close to nest.

15th October - 4.00 p.m. Saw one chick feed from nectar tube for first time. Female observed making exaggerated pendular flight in front of nectar tubes when chicks are close to her, stabbing at the tube with her bill (this was observed on a number of occasions before chicks were removed).

19th October - Both chicks removed to 6 ft flight cage. I placed four glass feeders with their nozzles tipped red to encourage them to feed. They were both feeding within 20 minutes and both had bathed within one hour.

Description of young Amazilia

Upperparts bronze-green, upper tail coverts rufous. All underparts pale brown, vent and thigh white, ocular spot white, upper mandible black, lower flesh coloured.

I believe this is the first time that this species has been bred in Britain, and indeed in Europe.

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As described above, the Peruvian Brown-bellied *Amazilia a. amazilia* has been bred by Mr. R. Elgar and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

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BREEDING THE FIVE-COLOURED MANNIKIN

Lonchura quincolor

By ROGER GREEN

(Beckenham, Kent)

The Five-coloured Mannikin is distributed on the Lesser Sunda and Timor group of islands, being found on Lombok, Sumbawa, Flores, Alor, Sumba, Timor, Sernatta and Balar.

Overall size and shape is about that of the Spice Finch. The forehead and face are dark chestnut with pale feather shafts, most noticeable on the ear coverts. Crown and nape are a darker, less bright chestnut with obscure greyish subterminal bands or tips to the feathers. The throat is a very dark chestnut brown. The mantle, back, wing coverts and outer webs of primaries and secondaries are a less dark chestnut brown. The underside of the wing coverts are buff. The rump, upper tail coverts and the wide fringes of the pointed central tail feathers are a deep reddish yellow to bright, light golden. The median line of central tail feathers and outer web of others is chestnut brown, the rest of the tail being dull drab. The tibial feathers and under tail coverts are black; the rest of the underparts below the throat are white. The irides are dark brown, legs and feet grey. The bill bluish grey. The sexes are alike. (Goodwin, 1982).

In the spring of 1981 I had the good fortune of being able to purchase several different species of mannikins from the Lower Sunda Islands. Unfortunately other than Pallid Mannikins, and four Five-coloured, all the rest were single specimens of a species. Obviously I was rather hesitant in purchasing odd birds, not knowing if any more would become available but I purchased the four Five-coloured Mannikins. On closer inspection the birds' flight feathers were seen to be in poor condition so they were put in a 4 ft (1.22 m) flight cage. Unfortunately they were of a very nervous disposition, so although they could not fly very well I put them in an inside flight measuring 6 x 6 x 2 ft (1.83 x 1.83 x 0.60 m), with some young Red-headed Parrot Finches and Star Finches. Here they settled much better.

As summer approached, the birds started to moult and soon replaced their flight and tail feathers and they were soon flying a lot better. The four Five-coloured Mannikins were transferred to an aviary with an inside flight into my birdroom, together with a pair of Red-headed Parrot Finches and a pair of Star Finches. The overall enclosure was some 14 ft long by 6 ft high and 5 ft wide (4.27 x 1.83 x 1.52 m). The aviary was planted with kerria, honeysuckle, elderberry and blackthorn, not over-

grown but certainly covered from the top by the honeysuckle and some adjacent tall conifers. Large bunches of seeding grasses were hung on the wire for the birds to eat the seeding heads and the Parrot Finches to pick off any insects.

The Five-coloured Mannikins settled in quickly and soon paired off. It became noticeable that both the cock birds were slightly larger than the hens and they had whiter underparts, though this could normally only be seen in good natural light.

Both cock birds started to display. This consisted of the bird stretching upwards, looking straight ahead, raising the feathers around the back of the neck and head, and singing an almost inaudible song. (In part similar to Chestnut-breasted Finches, although with this species there is a greater variety in the actual display).

One pair nested in a box inside the honeysuckle. Unfortunately after laying two eggs the hen was found dead for no apparent reason. The eggs were fostered by a pair of Bengalese Finches which successfully hatched and reared the young. The young were fed on soaked seed (white millet and canary seed), small maggots, a proprietary brand of eggfood and greenfood, normally lettuce.

After the loss of the hen, I was expecting the two cock birds to start bickering over the remaining hen but this did not happen. Instead, a nest was built in amongst the bunches of seeding grasses, approximately 4 ft (1.22 m) from the ground. The nest itself was completely made of dried grasses and it measured some 7 in long by 4 in (0.17 x 0.10 m); it was elliptical in shape and the actual nest chamber was approximately 3 in (0.07 m) in diameter.

Six eggs were laid, clear white in colour. The birds sat alternately, the hen only incubating the eggs at night. After approximately 14 days, the young hatched, light pink in colour and covered in a small amount of white down. They were reared on the same diet as the two reared by the Bengalese Finches, with the addition of soaked millet sprays plus any small insects caught by the adults in the aviary. The young were brooded by the parents until they were approximately 10 days old.

The five young left the nest after 21 days at which time they were basically a dull buffish-grey, with some dull white on the abdomen. The feet and beak were a very dark brown in colour. They were extremely nervous and special care was taken when feeding them. The parents were very protective of the young, incessantly calling them to roost together in a disused nest-box. The young were soon feeding themselves after seven days but the parents continued to feed them for two weeks after they left the nest.

At the end of the two weeks, the cock and hen built a new nest inside

the shelter in a 'ball of wire'. Five eggs were laid, of which four hatched and were reared.

The five young from the first nest were left with the adults and caused no problem to the new young or to any other birds in the aviary.

By now it was well into autumn and any further nesting activity was stopped. The young took several months to moult fully into adult plumage. Their moult was similar to that of aviary-bred Chestnut-breasted and Yellow-rumped Mannikins in that normally a few dark feathers break through after 12 weeks and then the feathers are gradually replaced, the last being those on the face and head.

In general, when Five-coloured Mannikins are settled into their quarters, they become hardy, peaceable and as long as they are not disturbed, spend many hours sitting in one spot, normally sunning themselves.

Their behaviour is not at any time like some species of mannikins, i.e. gregarious social preening, etc. The Five-coloured Mannikins always keep a few inches' distance from each other except when the cock displays.

Since the first year that I bred this species, they have bred with varying success. After purchasing my original stock, I was offered some fresh blood in 1984. There was a noticeable difference in so much that the original birds had a bright orange/rust coloured rump, whereas the new arrivals had an almost black rump, but otherwise they were identical.

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As described above, the Five-coloured Mannikin *Lonchura quincolor* has been bred by Mr. R. Green and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

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BREEDING THE CHESTNUT SPARROW

Sorella (Passer) eminibey

By ALLAN BROOKER

(Camberley, Surrey)

During the summer of 1984 I saw, for the first time, a small, chestnut brown bird at a London dealer's shop in a consignment of birds which had recently arrived from Tanzania. There were also two birds which looked like miniature sparrows and were the same size and shape as the chestnut bird. Although I could not then identify them, I thought that they must be of the same species and bought all three.

The birds were installed in an aviary measuring 7½ ft wide by 8 ft high and 15 ft long (2.29 x 2.44 x 4.57 m), covered with a PVC roof, the plants inside being watered by hose.

They seemed very wild and not really suitable to life in a cage. They always cowered or flew madly round whenever approached and always seemed to be at the back. I established their identity as *Sorella eminibey* whose range extends from the Sudan to northern Tanzania. According to the field guide, the cocks have an out-of-colour phase when they look like hens but I have not found this and my adult males retain their chestnut plumage throughout the year.

Unfortunately during the winter I lost the cock and it was not until the beginning of May 1985 that I saw two for sale in a shop. I bought both and moved one hen into an adjoining aviary of the same size and then put one cock in with each hen. There was a lot of chattering, typical of English sparrows and almost immediately interest was shown in the nest-boxes of which there were three, measuring 6 x 4 x 4 in (0.15 x 0.10 x 0.10 m), in each aviary, of the same shape as a Budgerigar nest-box. The birds quickly filled all six boxes with very fine grasses and hundreds of feathers. Each hen laid three eggs, which were bluish white covered with brown speckles, and within three weeks of buying the cocks, one pair had two young but the other pair's eggs were clear. The two chicks were reared and then another three. The other pair eventually reared two young but they had a lot of clear eggs. The incubation period was 18-19 days.

I feed these birds on a mixture of white millet, pannicum millet and canary seeds. Millet sprays are given each day and enjoyed by all the birds, also hard-boiled eggs mashed and mixed with chick crumbs. This is fed all the year round. Mealworms are supplied during the spring and summer and are probably taken by the Chestnut Sparrows though I have not actually seen this. As the aviaries are planted, the birds doubtless find many

insects.

The plumage of the young on fledging is the same as that of the hen, the only difference being a bright yellow, almost waxlike bill and white gape flaps which are lost during the next two weeks. The young males come into colour very slowly.

The Chestnut Sparrows live with a collection of waxbills and show no aggression towards them except when breeding and they then guard the top and perch of the nest-box.

As I had some young from each pair, I decided to keep them and try to breed from them the following year (1986) so I put rings on them and moved them together into another aviary so they could moult out. I was thus able to select more pairs for breeding.

I believe that this is the first time that this species has been bred in this country and it is a pity that the birds are too nervous to allow me to get near enough to photograph them.

As described above the Chestnut Sparrow *Sorella eminibey* has been bred by Mr. Alan Brooker and this is believed to be the first success in this country. Anyone knowing of a previous breeding, or of any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

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NESTING OF THE BLUE AND WHITE SWALLOW

Notiochelidon cyanoleuca

By Dr. YOSHIKA ONIKI

(Dept. of Zoology, State University of Sao Paulo, Rio Claro, Brazil)

The Blue and White Swallow has a very wide range, occurring throughout South America from the highlands of Costa Rica right down to Tierra del Fuego. It is a small bird (13 cm long; 11 g) with an iridescent dark blue back and undertail coverts and white belly. The young is brownish grey where the adult is blue. Although this is not a species regularly kept in captivity, it is interesting to report on its habits and nesting as it is commonly seen in urban areas, flying around buildings, chirping now and then, alone or in loose groups. They can also be seen flying gracefully over the large sugar cane fields, pastures, or the edges of woods not far from cities, to which they may return to spend the night. Sometimes they perch on telephone or electric wires to rest. At times, one perches on the ground and picks up insects. This takes only a few seconds and soon they resume their fast flight and soft chirps.

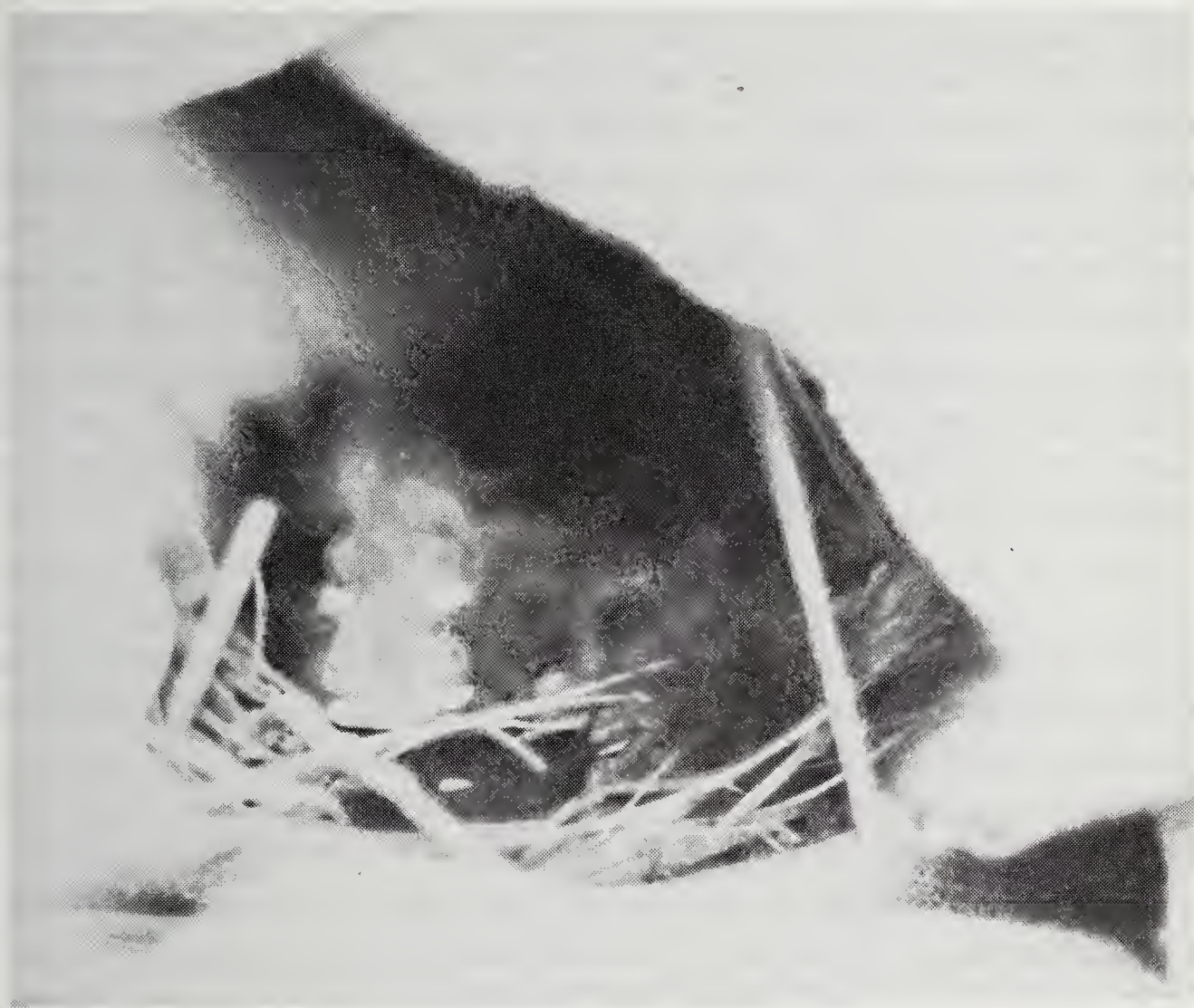
Nest and nesting material

On 12th January 1977 I was shown a nest with three young. It was placed on top of a closet within an office at the University of Campinas (UNICAMP), at a height of 2.7 m, where a burlap bag had been casually left. The birds placed their nest inside the bag and the nest rim was shaped according to the burlap opening. The nest dimensions were: external diameter 0.13 x 0.075 m, internal diameter 0.07 x 0.06 m, external height 0.03 m and internal height 0.02 m. The nest weighed 3.4 g, of which 2.5 g was of grass stems and the remainder was of 32 black feathers and white down, and one long (12 cm) black body feather.

The body of the nest was mainly of yellow grass stems, roots and rootlets, while dark pigeon feathers and white down formed the lining, making it soft and fluffy. On 10 May, when the nest was collected, it was full of white scales of feather sheaths. The nest was kept clean of faecal sacs. Perhaps eggshells were left in the nest and crushed under the young, but half an eggshell was found near the burlap bag on 17th January.

Young

Assuming the young were 0-1 days old when found on 12th January, the nestling period was about 23 days, for on 3rd February 1977, at 14:00, they were flying around the room while both parents were flying outside



Y. Oniki

Fig. 1. Young Blue and White Swallow

and calling to them. Skutch (1952) reports 26 and 27 days as nestling periods for Costa Rican birds, longer than I found. The young were quite brownish, with short tails, and were peeping constantly. When the window was opened they left the room. On 14th January, when the young were 3-4 days old, two large young were leaning on top of the third. On 17th January (Fig. 1) two young were larger than the third but all were still blind. They had swollen and light yellow gape angles, down projecting from the head and back, and pinfeathers growing on the back and belly.

On 19th January, the eyes of the young were slightly open and at 14:00 they weighed 5, 10, and 12 g respectively. The next day they weighed 4.5, 10 and 12 g at 13:35. At this time, the smallest young peeped but the two larger ones moved over the sack to hide away from the nest. On 19th January, wing quills of the two larger young were 0.4 and 0.5 mm long and tail pinfeathers measured 0.3 and 0.4 mm. The next day, wing quill and tail were 0.1 to 0.2 mm larger but weight increase was nil.

On 14th and 17th January, in observation sessions lasting 195 and 182

minutes there were 15 and 19 feedings of the young. On 14th and 17th January, 32 feeding intervals averaged 10.7 minutes (range = 2-46 minutes) and feedings were slow at about 14:00 and 16:00, and rapid at about 15:00. On three occasions, a single adult fed all three young in one visit, but on other visits it was not possible to ascertain how many young were fed. At times, after a feeding or between two feedings of young, an adult ate a faecal sac. If disturbed, the adult dropped the sac next to the nest and flew out hurriedly. On 19th January, when young were weighed and measured for the first time, there was only one feeding in a 100-minutes observation, and the adult perched frequently in the square opening to the room, gave 'peep' calls and flew about a lot, but fed only once after 16 minutes of watching immobile from the nest rim. After this, the adult left silently.

Because of protection afforded by the buildings and cliffs in which nests are placed, young Blue and White Swallows can remain in the nest for a long time despite it being open and cup-shaped. As a result, they are well plumaged and strong-flying and able to follow the adults, which are fast-moving birds that depend on gathering food in the air.

Parasites

When the young were 1-2 days old, mosquitoes were hovering above them and trying to bite. Due to the long time young remained in the nest, both they and it were infested with small mites, which caused them to scratch a lot. When young are able to move around they even sit out of the nest perhaps to avoid mites. This infestation by mites seems to be common among birds that nest in protected areas such as under roofs in buildings. This was also observed in a nest of a Rufous-collared Sparrow *Zonotrichia capensis* at Rio Claro, placed on a large fern vase inside a building (pers. obs.).

Behaviour of adult

On 14th January an adult sat on the nest for six minutes after one feeding, but no other brooding was noted.

There were two holes, of about 0.25 m diameter, in the office wall, one square and the other round, planned for a future ventilation system. I was surprised with the consistency with which adults entered the building from the square hole, sometimes perching briefly on it, and left from the round hole. Once one started to enter through the round hole but turned and entered through the square one. At times, both adults arrived together and one entered to feed while the other circled around outside the building. Feeding of the young was rapid, and the adult picked up pieces dropped, but young remained in the nest peeping loudly when the adults

were away.

Breeding season

Euler (1900:17) reports that the species has the 'same' nesting habits as *Progne chalybea*, the Grey-breasted Martin, using roofs of houses in farms and villages. He reports four white eggs in one nest. Ihering (1900: 207) says it nests from mid-August in Sao Paulo City. Two fledglings, with pale gape angles, were with an adult on the biology building at the Universidade Estadual Paulista (UNESP), Rio Claro, on 26th October 1984. Two other fledglings were with an adult there on 28th January 1985. At Rio Claro and Campinas nests were mainly found in January and February. On 27th January 1985 at UNICAMP, adults entered to feed noisy young in two nests. Both nests were between the roof and a rectangular light bulb.

Weight and measurements

In the cool mornings of 4th and 5th August 1984, Blue and White Swallows were mist-netted at the Agricultural Experiment Station in Ubatuba, Sao Paulo State. Nineteen weights averaged 11.0 g and 18 cloacal temperatures averaged 38.7°C. Average measurements of 11 individuals were: bill - 5.2 mm; tarsus - 10.3 mm; tail - 50.3 mm; and wing - 93.7 mm.

ACKNOWLEDGEMENTS

I am grateful to K.S. Brown for showing me the nest in his office, J.G. Chiquito for printing the photograph, and E.O. Willis for comments on the manuscript. The visit to Ubatuba was made while I held a fellowship from Conselho Nacional de Desenvolvimento Cientifico e Tecnológico (CNPq) of Brazil.

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BREEDING RARE AND ENDANGERED BIRDS AT THE TIERPARK BERLIN, GDR

(Paper read at the Fourth World Conference on Breeding Endangered Species in Captivity, held at Flevohof Congress Centre, Netherlands, 24-27 September 1984)

By DR WOLFGANG GRUMMT
(Deputy Director and Curator of Birds)

Since the inception of Tierpark Berlin 29 years ago, we have systematically put together a collection consisting of breeding pairs or groups aimed at maximum reproduction. This approach is based on modern zoological principles, i.e. the captive reproduction of rare and endangered species and subspecies, and I would now like to report on our experiences in this regard with birds.

Naturally, we have not confined our programme to endangered species alone and have also bred more common species as one does not know and cannot predict which birds that are common today will be the endangered species of tomorrow. Furthermore, it is important, as has often been pointed out, to breed the more common species in order to gain insight into the management needs of endangered forms. I would remind readers that important bird of prey breeding programmes were begun with the American Kestrel *Falco sparverius* and the Andean Condor *Vultur gryphus* and in the case of cranes, with the Sandhill Crane *Grus canadensis*.

A good example is shown by the pelican colony at Tierpark Berlin. In 1958 the pelicans produced the first clutches and in 1961 (Dathe, 1961, 1962; Grummt, 1961) a chick was hatched by the European White Pelicans *Pelecanus onocrotalus*. At that time no one was aware of a reduction in the wild population, still less that the bird would become endangered. In the interim there has been such a drastic reduction in the population of the Dalmatian Pelican *Pelecanus crispus* that the bird is now listed as 'vulnerable' in the Red Data Book and is listed on Appendix I of CITES. In the report of the Council of Europe for 1981, entitled 'Birds in need Special Protection in Europe', the Dalmatian Pelican is listed as 'endangered', as is the European/Asiatic population of the European White Pelican.

Since our first breeding success we have systematically studied the behaviour and breeding biology of these birds and to date have continuously bred them for more than 23 years (Grummt, 1983, 1984).

Over the years 20 European White Pelicans have been hatched from three different pairs, most of which have been successfully reared. Nine of the pelicans hatched at Tierpark Berlin are of the full second generation. Furthermore, two chicks each of the following species have also been bred: American White Pelican *Pelecanus erythrorhynchos*, Dalmatian

Pelican *P. crispus* and Brown Pelican *P. occidentalis*.

Based on our experiences, the following conditions should be provided for successful pelican breeding:

1. Large groups of birds to facilitate social stimulation and synchronisation;
2. Optimum feeding on freshwater fish, if possible, because, except for the Brown Pelican, all other species of pelicans feed almost exclusively on freshwater fish;
3. Provision of adequate nesting sites and nesting material.

A species which deserves very close scrutiny is the Greater Bustard *Otis tarda*. The north-west border of its distribution occurs in the German Democratic Republic. While approximately 800 of these magnificent birds occurred in our country in 1975, its numbers have now shrunk to around 350 despite intensive protective measures. The first breeding success in captivity was achieved by Dr. Gewalt (1965) at the West Berlin Zoo in 1964. Since 1958 we have kept Greater Bustards at Tierpark Berlin in an enclosure of 2500m². In 1972 a hen laid four fertile eggs, all of which hatched and two of the young were successfully reared (Grummt, 1977). Unfortunately, we lost the breeding birds which put an end to what seemed to be an exciting beginning with the species. At the moment we have 2:3 birds of this species. This year one of the hens laid but the eggs were thin-shelled. The other hens should reach sexual maturity in 1985 so that our chances look a lot brighter for the future. One male was very active this year and went into full display. He copulated numerous times with one of the hens.

A 'first' for Tierpark Berlin, and one that has brought us great pleasure was a breeding among our cranes. In 1980 we received a pair of Manchurian or Red-crowned Cranes *Grus japonensis* from the Peking Zoo. In 1981 the birds produced a clutch of two eggs, one of which was fertile but did not hatch. During 1982 and 1983, due to disturbances, this pair did not lay. In the period between 29th April and 28th May 1984, the Manchurian Cranes produced six eggs, which were collected and placed in the incubator. All six eggs were fertile and five of them subsequently hatched. Of the five chicks, one was very weak upon hatching and died 12 days later. Another chick died as a result of a yolk sac rupture. The remaining three chicks were reared without any difficulty. It is our intention to build a special breeding area where we shall try to put together additional breeding pairs using the three birds hatched in Berlin and four additional specimens received from the Pyongyang Zoo, North Korea, and one male on breeding loan from Rotterdam Zoo.

In the case of storks and ibises, we have had excellent success with certain species. In our Waldrapp *Geronticus eremita* colony, which consists of 20 birds, we have reared 11 young since 1981. European Spoonbills *Platalea leucorodia*, Scarlet Ibis *Eudocimus albus* have been breeding successfully for a number of years. Unfortunately the breeding success achieved with the African Marabous *Leptoptilos crumeniferus* in 1979 was not repeated, as the breeding male was killed by the female. The two remaining pairs, which consist of the original breeding female with a new mate and the female hatched in Berlin paired with an imported male, both displayed this year and showed nesting behaviour so that there appears to be hope for the future with this species.

Black Storks *Ciconia nigra* have reared young on numerous occasions and White Storks *C. ciconia* bred here consistently. In 1981 we received a pair of Eastern White Storks *C. boyciana* from the Moscow Zoo. This pair is very compatible and we look to the future for successful reproduction.

As for the pheasants, I should like to mention our great success since 1968 with the White Eared Pheasant *Crossoptilon crossoptilon* (Grummt, 1980). At the moment we are expanding our pheasantry and six new aviaries are already completed. This will give us the opportunity to keep and breed other endangered galliformes.

A group that deserves our utmost attention is the parrot family, particularly several New World species whose numbers have been greatly reduced due to traffic in live birds and the destruction of their natural habitat. With the exception of three species, all parrots are protected under CITES, which will curtail the acquisition of new birds from the wild. Therefore the captive breeding of parrots has taken on greater importance. Rosemary Low, the well-known parrot specialist and expert, reported on this at the Jean Delacour/IFCB symposium in Los Angeles (Low, 1983).

We have been highly successful in breeding the Halmahera Eclectus *Eclectus roratus vosmaeri* at Tierpark Berlin. One pair of birds has reared a total of 32 chicks between 1965 and 1977 (Grummt, 1973b). The Cuban Amazon Parrot *Amazon leucocephala* first bred successfully in 1981.

Although we have kept macaws since the foundation of Tierpark Berlin, it was only at the beginning of the 1970s that we started to try to breed with these parrots. The first breeding occurred in 1974. One pair of Buffon's Macaw *Ara ambigua* and a pair of Military Macaws *A. militaris* were housed together in an 8 m² aviary. All four birds were compatible. The Buffon's Macaws nested in a hollow tree trunk, while the Military Macaws simply laid their eggs on the floor of the aviary. The Buffon's Macaws hatched three young, of which two were reared.

This was the first captive breeding of this species. The Military Macaws hatched a single chick which they reared and the following year reared two chicks. The Buffon's Macaws reared a single chick in the years 1975, 1977 and 1979.

Due to the fact that the keepers were changed a number of times, the macaw breeding came to a standstill. It was not until 1984 that attempts were again made and fortunately these were successful. The breeding pairs are now housed in indoor aviaries that are about 2-3m².

The pair of Buffon's Macaws which nested from 1974-1979 laid four eggs between 29th May and 8th June 1984. The first egg was broken, but the remaining three hatched. Unfortunately, two of the chicks died. The remaining one was taken away from the parents when it was 34 days old and hand-reared.

A pair of Scarlet Macaws *A. macao* laid a clutch of three eggs between 20th May and 25th May 1984 behind a board that was propped against the aviary wall. A chick could be heard hatching on 17th June. This excited the pair of Green-winged Macaws *A. chloroptera* housed in the next aviary to such an extent that their screaming drove the Scarlet Macaws from the nest. The eggs were placed in the incubator, and although two chicks hatched, they could not be reared.

On 6th July, 20 days after leaving the clutch, the first egg of the second clutch was laid. After an incubation of 27 to 28 days, two chicks were hatched and reared.

Of great joy to us was the nesting activity of our Red-fronted Macaws *A. rubrogenys* which were imported in 1974. Three eggs were laid on the floor of the aviary in March 1984. One chick hatched on 29th April, and although well cared for, it died at four days old. On 20th May, 16 days after the death of the chick, the hen laid again, this time in a nest-box. On 13th June, a few days before the eggs were due to hatch, all the eggs had been expelled from the nest. All three eggs contained well-developed embryos. On close inspection it was discovered that the macaws had gnawed a hole through the 50 mm thick bottom of the nest-box. The box was repaired and the first egg of the third clutch was laid 17 days later on 30th June. On 27th July, after an incubation of 27 days, a chick could be heard in the box. A total of two chicks were hatched and reared.

Although our breeding record with swans, geese, ducks, flamingoes and owls has been highly successful, I would like to devote the rest of this article to our birds of prey breeding programme. This has been rather long term due to the slow maturing of the birds.

In our large flight cage for birds of prey, which is 1200 m² (Dathe, 1967), we house principally vultures and Tawny Eagles *Aquila nipalensis*. For breeding purposes, pairs should be housed in individual aviaries. The majority of the breeding aviaries have a surface of 28 m², but a few are

50-60 m².

The Long-legged Buzzards *Buteo rufinus* bred for the first time in 1970 (Grummt, 1973c). By 1984 a total of 22 young had been reared among which were the first of the second generation. Tawny Eagles first began breeding in the large flight cage in 1972 and to date have reared 12 young. Young birds bred at Tierpark Berlin and sent to a small zoo in the German Democratic Republic are now breeding in the second generation. The first Bald Eagle *Haliaeetus leucocephalus* was hatched in 1975. Since the parents would not care for it, it was fostered out to the Long-legged Buzzards who reared it without problems. Starting in 1976 the Bald Eagles have cared for their young and to date have reared 16. It is worth noting that on three occasions, in 1979, 1983 and 1984, three chicks have been reared from each clutch.

Golden Eagles *Aquila chrysaetos* have bred successfully since 1980 with a total of 11 reared. The number of chicks per nest has varied. On four occasions two young were reared and on one occasion, three chicks.

In the case of the Wedge-tailed Eagles *Aquila audax* it was a long time before the birds nested successfully. We received the birds in 1957 direct from Australia; they were almost fledged when removed from their nest at the end of 1956. The female laid for the first time in 1969 at 13 years old. The first young hatched in 1981 and by 1984, five had been reared.

The first Black Vulture *Aegypius monachus* was reared in 1980. This bird was parent-reared and as far as we know this was the first time this species had been bred successfully in captivity.

After many failures we were able to artificially rear a Secretary Bird *Sagittarius serpentarius* in 1983.

In 1965 we acquired two Striated Caracaras *Phalcoboenas australis*, which proved to be a pair. After a number of infertile clutches, a chick was hatched in 1983 which was hand-reared. In 1984 the Striated Caracaras have cared for their young and have reared two.

The greatest success at Tierpark Berlin with birds of prey has, without any doubt, been the breeding of the Harpy Eagle *Harpia harpyja*. In 1972 and 1973 we imported two young Harpy Eagles direct from South America. Both of these birds proved to be females as each laid eggs in 1979. In April 1981 we were able to obtain a male on breeding loan from Adlerwarte Berlebeck in the Federal Republic of Germany. After carefully introducing the pair, it did not take long before the birds went to nest. A young Harpy Eagle hatched on 4th September 1981 after an incubation period of 56 days. The chick was reared by the parents without difficulty. On 4th November 1982 and 18th January 1984 two more chicks were hatched which were again reared by the adults. Observations on the rearing of the young provided a great deal of new information on

the breeding biology of this bird. This data will be published at a later date.

Despite the successes described above, I am in full agreement that a great deal of effort must be given to the establishment of self-sustaining populations of as many species as possible in order to perpetuate the growing number of endangered forms.

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TWO-WATTLED CASSOWARY BRED AT TARONGA PARK ZOO, SYDNEY, AUSTRALIA

By ROSEMARY LOW
(Taunton, Somerset)

A notable hatching occurred at Taronga Park Zoo, Sydney, on 1st November 1986. 'Clawed' weighed in at a massive 393 g and is the first recorded Two-wattled Cassowary *Casuarius casuarius* to be hatched since 1934 when Taronga first displayed these powerful flightless birds (capable of disembowelling a man with a single kick).

The parents have been at Taronga since 1978. In September the female laid four eggs which, as is usual in cassowaries, was incubated by the male. Towards the end of the incubation period (as long as 55 days) he abandoned the eggs. They were placed in an incubator but three failed to hatch.

At first 'Clawed' was kept in a brooder with a chicken for company and fed on finely chopped, soft tropical fruits, sweet potato and tomato, with added calcium and vitamins. On sunny days he was exercised out of doors by the keepers and soon demonstrated incredible running ability.

The Two-wattled Cassowary is found in northern Queensland, being one of the rainforest's shyest and wariest inhabitants. Ever alert to danger, it keeps to the most dense areas of forest and uses its helmet to force a path through thick vegetation. Remaining hidden during the day, it emerges at night to feed on fruit, seeds and berries.

Two other species, the Single-wattled and Bennett's Cassowary, occur in New Guinea. All three are threatened by habitat destruction and the New Guinea species are hunted. Young ones are kept by the natives in enclosures until they are large enough to be eaten.

'Clawed' will be recorded in the Australasian Cassowary Studbook. Eventually he will be sent to another zoo in Australia as part of a carefully monitored breeding programme. Captive breeding may prove vital for the survival of cassowaries although to date few successes have occurred. In Britain the first - of Bennett's Cassowary - took place as long ago as 1864 at London Zoo. The Double-wattled Cassowary was bred in this country for the first time at Edinburgh Zoo in 1967 where the success was repeated in 1968 and 1969. This species was also bred at San Diego Zoo in 1957 and four young were hand-reared in 1977 at the Villars-les-Dombes Park in France.

THE PROTEA CANARY

Serinus leucopterus

By NEVILLE BRICKELL

(Avicultural Research Unit, South Africa)

The Protea Canary *Serinus leucopterus* is also known as Layard's Seedeater, Dusky-faced Seedeater and White-winged Seedeater. Clancey (1963) suggested that to call it by its popular name White-winged Seedeater, which was coined by Sharpe, is misleading as the bird is not white-winged, having no more than off-white or buffish white terminal spotting to the medium and secondary coverts; the Protea Canary is most closely allied to the Thick-billed Seedeater *Serinus burtoni*. The South African Red Data Book lists it as protected by provincial laws but a survey of the species' distributional and numerical status is required (Siegfried et al., 1976).

This is a rare species, usually found solitary, in pairs or in small flocks of up to 10 birds. They are difficult to observe as they generally keep within the confines of dense vegetation. Flight is fast and direct at no great height. The call has been described as short phrases of mellow notes interspersed with nasal, wheezy *jeeer* notes (Maclean, 1985). The sexes are alike. Forehead, crown, nape and mantle sooty brown, centres to feathers darker and tinged with olive; rump and upper tail coverts tinged olive yellow; tail earth brown, the outer webs edged paler; ear coverts blackish; chin and mid-forethroat white; breast and belly buff, tinged olive, streaking on breast darker buff and centre of belly white; wing coverts and flight feathers earth brown; axillaries and under wing coverts yellowish; iris brown; bill pinkish to whitish, the culmen-ridge and tip darker; legs and feet blackish brown to greyish brown. Immatures have not been described.

The Protea Canary frequents mature Protea fynbos on mountain slopes, also penetrating stands of exotic pines and evergreen forest in some parts of its range. Occurs in the Cape Province of South Africa from Pakhuis Pass in the northern Cedarberg, south to Caledon and eastwards to Cockscomb in the Grootwinterhoekberge. An extensive survey on feeding was undertaken by Milewski (1978) which revealed that the Protea Canary ate a wide variety of food items from 77 plant species and about five invertebrate species; the diet consists mainly of the seeds of the Protea, supplemented with soft plant parts (foliage, flowers, fruit and nectar) and insects; food genera recorded in the diet of this species, namely Graminoid seed *Tetraria* (Cyperaceae), *Restio*, *Elegia* (Restionaceae); Achenes (possibly also composite floral parts) *Metalasia*, *Senecio*, *Ursinia*; other small

seed *Pelargonium* (Geraniaceae), *Anthospermum* (Rubiaceae), *Erica* (Ericaceae), *Salvia* (Lamiaceae); large seed *Raphanus* (Brassicaceae), *Psoralea* (Fabaceae), *Rhus* (Anacardiaceae); seed kernels in (ripe or unripe) fleshy fruits *Olea* (Oleaceae), *Cassytha* (Lauraceae); nectar (possibly also floral parts) *Halleria* (Scrophulariaceae), *Salvia* (Lamiaceae); fruit-pulp *Diospyros* (Ebenaceae); fresh floral parts *Aspalathus* (Fabaceae); foliage buds *Cliffortia* (Rosaceae); animal matter (invertebrates) genera and families unspecified.

Breeding takes place from August to October when a cup measuring 5, 3-5, 8 cm diameter and 3,5-4, 7 cm depth is constructed of dry plant stems. Recorded are Kooigoed, an Afrikaans word for several scrambling aromatic species of *Helichrysum*. Fine, wiry grass is used to hold the outer shell together with fluff of Oleander-leaved Protea *Protea neriifolia* as a lining. Nests are placed at 3-5 metres from the ground in the vertical fork of a Protea bush or exotic pine. Two to four eggs are laid. The eggs are ivory white to very pale blue, spotted and lined with brown, purple and black, chiefly at the large end. Egg measurements average (6) 20,6 x 14, 6 (19-21, 7 x 14, 4-14, 9). Incubation period is recorded at 17 days with the nestling period at least 14 days. The young are fed by both parents. I can find no record of this species having been kept or bred in aviaries anywhere in Africa, and no notes have previously been written about it in the *Avicultural Magazine*.

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Artist: Rex Shirley

Protea Canary *Serinus leucopterus*

SOME NOTES ON CANARIES

By DEREK GOODWIN

(Petts Wood, Kent)

In response to a hint from our fair editor that a little 'copy' for the magazine might not come amiss, it occurred to me that the domestic Canary *Serinus canarius* is one of the few species that I have kept which I have not yet written about in our magazine. I propose here to rectify the omission though I fear that those who read it may come to the conclusion that 'rectify' was a wrong word to use.

There will be nothing here of use to the Canary fancier. No advice on how to breed bigger and more beetle-browed Norwich, longer and larger Yorkshires or more distorted Scots Fancies, wherewith to obtain coveted prizes. I propose merely to give an account of some of my experiences and observations and throw in a question or two here and there in the hope that some readers more knowledgeable on the point than I will be able to answer them in a future issue. Inevitably any article dealing with the behaviour of this species must, to some extent, duplicate and overlap information given in Nicolai's detailed study of the behaviour of this and other species in the genus *Serinus*. His work (see references) should be read in full by anyone concerned seriously with the behaviour of the Canary and its allies.

Canaries and I

Some readers may recall that the first birds I kept when a small child were a pair of Bullfinches *Pyrrhula pyrrhula* (Goodwin, 1952 and 1985). These were at first kept in a cage in the dining room but, for reasons that I forget, were soon moved to my bedroom, perhaps marginally less suitable a place. As I have narrated, this Bullfinch pair did actually regain their freedom. Before doing so, however, they lived with me for about 18 months and in that time my stock was increased, first by a Goldfinch and then by some Canaries. The Goldfinch I had seen and 'fallen for' in the pet department of a large London store. A very 'posh' one too, that charged 7 shillings and sixpence each for its Goldfinches, a third more than the then average price of 5 shillings.

Someone had told my father, who then and for some years after, took a rather fluctuating interest in my bird-keeping, that 'Goldfinch Mules' could be easily and plentifully bred just by putting a cock Goldfinch and a hen Canary together and that such hybrids were of great monetary value. Fired by these mistaken or mendacious statements my father

bought a clear yellow (technically a 'buff' in fanciers' terms) Norwich Canary (the breed had not got so monstrous then, as it has since). Not surprisingly, she and the Goldfinch regarded each other with indifference, which changed to hostility when some mutually desired food or perching place brought them close to each other. Both my father and I were disappointed at this lack of reproductive impulses and soon the idea of Goldfinch Mules was abandoned (perhaps my father had learnt of their true and slight monetary value, in most cases, and of the difficulties of breeding them) and a cock Norwich Canary was added to the collection. He was what I believe is known as 'heavily variegated', that is, he had most of each wing dark muddy brown and some of the same colour on his head, contrasting with his orange body. The orange and muddy brown hues were due to colour feeding and he moulted out more or less the same lemony yellow as the hen, already christened 'Sulphur' and with his dark areas more or less of the olive grey tones found in the wild Canary.

A large box cage had been procured and fitted up with a nest-bowl. The two Canaries wasted little time and soon, to my intense excitement, Sulphur laid her first egg. My father had by now read up, and also read to me, much of the then current wisdom about Canary keeping so the egg was removed, placed on bran in a box, and a pot egg substituted for it. Amazingly, considering the number of times I disobeyed my father and covertly examined, handled and generally gloated over them, at least two of the four eggs were not seriously damaged and in due course produced two young, one much like his father and the other clear yellow ('buff') like his mother.

When the next clutch of eggs was being incubated, we moved house, from Surbiton to Virginia Water. I was much concerned about the Canaries, in fact *only* concerned about them, and not the trauma which I suppose my parents had over the move. Partly to pacify me, a car was hired to take us and the Canaries to the new home and, which astonishes me even now, Sulphur sat throughout the journey and did not desert when the cage was set up in the new house. Perhaps as a result of the journey only one young one was hatched and reared. It subsequently proved to be a cock, had its entire back olive green with darker streaks (much like a wild Canary's) and was called 'Greenback'.

Perhaps because none of them reacted socially to me, perhaps because I subconsciously considered them as, in part, my father's birds, my first passionate involvement with the Norwich Canaries did not last. They, and some Rollers that my father later got, bred for many years but tended to do so less successfully as the years went on. Many were given away each year, some escaped, some died (with hindsight I can see why!) and the sad end result was that by 1937, barely 11 years after the stock had been star-

ted, there were no Canaries left.

Except for two hen Borders that I had for some months in 1958, I did not keep Canaries again until late in 1965 when I purchased some Red Factors and bred from them, mainly because I was interested in one or two aspects of Canary behaviour which I felt I *ought* to have remembered from earlier days but to my irritation had not. Also, it had been stated in at least one 'authoritative' work on bird behaviour that Canaries, and by implication other cardueline finches, fed their young for the first few days on crop milk comparable to that of pigeons. I felt sure that this was not the case but had to admit, when I got embroiled in an argument over the matter, that I had no proof. So I wanted to look again and more closely at parental feeding in Canaries.

For the next ten years I always had some Canaries, all red factors, usually two pairs, not the same two all the time, and often a few current year's young ones. I gave away many young Canaries but to a large extent was forced to curtail numbers by sterilising eggs before allowing the birds to sit. I had chosen red factors partly for their attractive colours but even more because most of them then were fairly near to the wild Canary in general size and shape, certainly far more 'natural looking' than the (in Britain) most popular fancy breeds.

Red factor Canaries and their colorations

As all who read this are likely to know, or at least, like myself, to have been informed, red factor Canaries were produced by hybridisation with the Red Siskin or Hooded Siskin *Carduelis cucullatus*. Back crossing hybrids to Canaries and selective breeding enabled the 'red factor', that is a gene or genes permitting the development of red pigment, to be transferred to what are now, in other respects, apparently pure Canaries. However, from what I have seen and the very little I have read on the matter, it appears that although some red factor Canaries show delicate shades of pale orange, pinkish yellow, ivory white and (when they have melanin pigments also) rich reddish browns, orange browns, buffs and yellowish green; red or orange-red colour can only be obtained by careful feeding, prior to and during the moult, with foods containing red carotenoids and lacking yellow carotenoids. The resultant reds tend too, to look very 'unnatural', not much like the lovely near-vermilion of the Red Siskin. I bought at times two or three red factor Canaries that were a deep orange-red or shrimp (boiled) red. All these birds, fed on abundant greenfood and some eggfood besides seeds, moulted out pale orange yellow or pinkish yellow.

Sexual differences and the (often great) differences of coloration between adults and young in red factor Canaries are sometimes attributed to

the Hooded Siskin ancestry and this may well be so. On the other hand, in the wild Canary, and some other serins, the juvenile plumage is much paler and browner than that of the adult. Also in the wild Canary the cock is much brighter than the hen and less profusely marked on breast and flanks.

Of my young red factors that I kept to adulthood and made careful notes on, a hen with wild Canary-type markings was basically a medium, quite dull brown in juvenile plumage and moulted into a general orange brown. Her face and breast became much brighter and more orange, presumably through abrasive moult, in spring and summer. A hen, which in her juvenile plumage was pale orange with a brown 'cap', moulted out a darker orange with a still darker orange cap. A cock who was cinnamon brown moulted out deep orange and a hen who was a clear, delicate ivory colour in her first plumage, moulted out, rather to my disappointment, a pale pinkish orange.

To what extent the many new and beautiful (if hardly *red*) colours found in red factor Canaries are due to genes introduced via the Red Siskin has always seemed to me 'unproven'. The original Norwich Canary had a *naturally* rich golden yellow colour (Wallace, 1903); the much lamented London Fancy was apparently golden with grizzled (in juvenile plumage solidly dark) wings. These two types vanished without trace sometime in the previous century but could their, or similar, genes have 're-surfaced' in our present day red factors?

I will say no more on this topic, of which I know little, but appeal to any reader with more knowledge of the subject to write an article giving us information on it.

Nothing in the behaviour of my red factors suggested that they were not in this aspect identical to 'pure' Canaries. On the other hand, I have not kept Red Siskins so may have failed to recognise traits of this species. Again, information from those with knowledge of the matter would be welcome.

I did notice that my red factors were very unwilling to eat 'plain' canary seed and left to their own choice ate, of seeds, mainly niger and (when available) hemp, as well as large amounts of soft food and green food. I think, however, that my own reluctance to force them on to a less rich (and cheaper) diet, rather than Red Siskin genes, may have been responsible for this. I was perhaps overconscious that the Canaries of my boyhood had probably been, all unwittingly, kept on too meagre a diet.

General and feeding behaviour

Like most long-domesticated species, Canaries are usually very willing to sample new foods. Such 'unnatural' foods as egg-food, milk sop and the like, are always eaten eagerly, although some Canaries show little enthu-

siasm for some of the modern 'all purpose miracle' type ready made-up rearing foods. Compared with other small seed-eating birds, Canaries usually take, if given the chance, a lot more fruit and green vegetables. I can remember in my childhood giving such things as pineapple, and even strawberry jam to Sulphur and her mate. I did not give much in the way of fruit to the red factors kept later but did establish that although they took sweet eating apple eagerly (if cut across so they could get at the flesh easily), sour cooking apples were invariably rejected after the first taste.

Like our Linnet, Goldfinch and Redpoll, the Canary regularly uses its feet to hold greenfood, stems of seed heads and the like, down to a perch while it feeds from them. In general Canaries seem uninterested in live food. I did, however, have two hens for a time in a room with various estrildids that became very fond of Blowfly pupae. I think they regarded them in the light of 'soft-centred seeds'. Also one of my red factor cocks ate Blowfly maggots readily and fed them to his nestlings.

Where birds of approximately equal age and condition are involved, cock Canaries are normally dominant over hens, except during the breeding period. When or before serious nest-building starts, the hen becomes dominant over the cock. This presumably functions to give her 'a free hand' at and around the nest without risk of interference from the cock. The changeover period can, at least under domestic conditions, be fraught with tension and flare-ups of aggression. Nicolai says, no doubt correctly, that any appreciable lessening of the cock's reproductive impulses may cause a cessation of his submissive attitude to his mate and he may then attack her if she threatens him or if she solicits him too importunately. Dominance reversal between the mates also gives the hen confidence to assert herself over other cock Canaries, should she be pestered by them.

This dominance of the hen during the breeding period occurs in some (possibly all) other cardueline finches also and may sometimes give the hen confidence to assert herself over birds she would normally flee from. I saw a nice example of this (I hope readers will forgive the digression) in mid-April of 1982. This was a 'Siskin winter' in the Petts Wood area and many Siskins *Carduelis spinus* had been coming for peanuts since February. They were, however, only able to feed at a hanging peanut bag in heavy rain or when somebody was standing close to it. At other times the peanut bags were taken over completely by House Sparrows *Passer domesticus* and, when these took shelter in moderate rain or because a human came too near, by Great and Blue Tits *Parus major* and *caeruleus*. The latter showed 'vindictive' aggression towards the weaker Siskins as they do towards Coal Tits *P. ater*. On this occasion I was standing within a couple of feet of the peanut bag in order to allow a fine cock Siskin to feed from it. A hen

shortly appeared, he casually made threatening movements towards her but she, who had evidently just developed the 'change of heart' in reference to feminine status, turned on him furiously, chased him off and returned to the peanut bag. After she had fed a little, I moved away and instantly a Blue Tit flew at the Siskin to drive her off. She, as if out of habit, flew to a bough about 10 ft away but when the Blue Tit, instead of feeding, flew at her again to drive her further away, she seemed to 'remember' her new status., turned and fought back and finally chased off the Blue Tit! Unfortunately for both, I then went indoors and the House Sparrows moved back to the peanuts.

Reproductive behaviour

If a pair of Canaries are put together well ahead of their (subsequent) nesting time or if the cock is put with the hen before she has selected a nest-site, then it will be seen that the cock takes the initiative in nest-site selection. He searches for suitable places, and having found one, turns around in it, usually making movements similar to those of the hen when 'shaping' her nest. Sometimes he mandibulates potential nesting material and carries it to the site he has selected but he does not, in my experience, ever perform actual nest-building with it.

All nest-building is done by the hen, once she has selected the nest-site or, as it is more usually the case, 'approved of' the site that her mate has selected. Normally the nest is placed in some bowl, basket, or topless or half frontless box supplied by the birdkeeper but if the aviary has suitable bushes or shrubs and an abundance of suitably fresh, tough and not too dry material, Canaries are usually quite capable of building more or less Greenfinch-like nests for themselves.

The eggs, usually three to five, and pale greenish blue with purplish flecks and dots, are laid in the morning at daily intervals. Most domestic Canary hens seem to incubate from the first day. The cock does not normally incubate or brood young but he feeds the hen both on and off the nest. Like the Goldfinch, the hen Canary is in no way inhibited from noisiness at the nest-site. Even when incubating or brooding nestlings she not only begs (or would feminists prefer the word 'demands'?) food loudly when her mate comes to the nest but she also calls out loudly and often when she hears him nearby. I, and I imagine many of our readers, have often discovered Goldfinches' nests through this calling of the sitting hen but, presumably, no common natural nest predator of this species or the wild Canary can use its ears to find nests, else natural selection would long ago have forced the females of these species to be quieter than they are.

I paid detailed attention to parental feeding in my red factor Canaries and confirmed what I had assumed from my boyhood observations, and

is implicit in most non-ornithological writings on the subject, that the Canary does not produce crop milk or any substance analagous to it. It is, of course, possible that saliva or similar liquid may (and probably does) mix with the food fed to the young and this may contain some enzymes, trace elements or whatever. My Canaries did not seem to discriminate between animal and vegetable foods or to select foods of high protein content for the young; so long as the food was palatable and soft it was fed readily even to small nestlings. No doubt, under wild conditions, this would result in the young being fed at first only with suitable foods, probably mainly or entirely seeds still at or only a little beyond the 'milky' stage.

Both sexes feed the young but only the hen broods them. It is probable that under natural conditions most of the food that she gives them for the first week or so has been given her by the cock, although when the birds are in a cage where the hen can see from the nest that some new and much-liked food has been put in, she will come off to take food for herself and her young more often than she would otherwise do. The young are fed from the crop, the parent, as in other cardueline finches, bringing up mouthful after mouthful and feeding each separately to a young one. If not yet moulting, the hen usually starts a second nest (if given the chance) before or very soon after the young fledge. She usually ceases to feed the young as soon as, or shortly before she begins to lay the second clutch and her mate is left with sole 'responsibility' for them. In my boyhood days my father and I had some trouble with hen Canaries plucking the body feathers from their young but, misled by the 'advice' then published on such matters, did not draw the correct conclusions. I now have no doubt that in most, probably all, such cases the root cause is an insufficient diet, probably deficiency of salt and/or protein being the major factor. Feather plucking in parrots is now known to be caused by lack of salt in the diet.

Young Canaries, when begging, flutter their wings but at the moment of actual contact, when the feeding parent inserts food into the young bird's mouth the latter's fluttering wings instantly 'collapse' and fold against its body, only to flutter again the moment physical contact between parent and young is broken.

Note on calls and song

Nicolai has dealt very fully with the vocalisations of the Canary and other *Serinus* species and those of my readers who keep Canaries are likely to be familiar with their calls so here I will touch on only one or two points of interest.

The *sweet* or *tsoo-eet* that some naive keepers fondly think is the bird answering their endearments in kind when they peer into its cage, is in

fact a note of alarm or anxiety. Most of our British finches have homologous and very similar sounding alarm calls, that of the Greenfinch *Carduelis chloris* being almost identical to the Canary's in sound, at least to my ears.

I twice heard this *sweet* call given in a very harsh and emphatic manner by a cock Canary (whose mate was sitting) when he saw, from the window, a tabby cat in the garden below. Neither he nor any of my other Canaries showed any alarm at, or more than slight and superficial interest in a stuffed Burrowing Owl *Speotyto cunicularia* (a species very like the Eurasian Little Owl *Athene noctua*) which I showed them.

Everyone who has taken any interest at all in Canaries or read a little about them knows that the Roller Canaries, which seem originally to have been produced in the Hartz Mountain regions of Germany, have a much softer and sweeter song than other breeds. Nicolai states that this has been brought about not only by selection for the best singers but by the biologically bad conditions in which Roller Canaries are usually kept - in small, dimly-lit cages; fed mainly on rape seed; inbred, etc. He states that this causes those - to human ears harsher and less pleasant - parts of the normal song which are particularly uttered by strong and fit cock Canaries, to be suppressed in favour of the softer parts of the song. He says that if Roller Canaries are kept for a few generations under good conditions, the sweet soft song is transmuted into the louder, harsher song of an ordinary Canary.

This is another aspect on which some of our readers may be able to give opinions based on personal experience and I hope that they will do so. I found the songs of my red factor Canaries, which *appeared* to have derived from Rollers on the Canary side, to be quite harsh and loud. Indeed not at all pleasant to my ears in the confines of a room.

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TAME WOOD PIGEONS

By AUDLEY GOSLING

(London)

Introduction

These notes relate to a group of unusually tame Wood Pigeons *Columba palumbus* in St. James's Park, London, and describe how the colony arose, the remarkable degree of tameness, and comment on related matters such as recognition and memory.

Prior to the re-emergence of the Wood Pigeon as a hand-tame bird there, I had been visiting St. James's Park regularly for two or three years, as I was then taking a particular interest in wildfowl, and the fine collections there and at Regent's Park were a means of learning more about them. In general, the closer the bird the more interesting, and if you feed them they come closer still. One cannot, however, feed the pinioned birds without feeding the wild ones as well, even if one wished to, for the latter, like park birds everywhere, are adept at snatching food intended for others, and I quickly settled down to feeding a fairly wide range of species. This may be relevant to the ease with which personal relationships were later established with certain wild birds, for, as discussed later, some birds can readily recognise a particular human being, so that by the time the Wood Pigeon story began I may already have become a familiar, and apparently harmless, dispenser of food.

Development of the colony

By the bridge across the lake in St. James's Park, House Sparrows *Passer domesticus* fly down readily onto the hands of those who feed them. Similar groups of hand-tame birds of various species exist throughout the world, but details of the birds' behaviour during the formation of such groups is not usually recorded. Clearly each group must start with one bird, more reckless than the rest, being coaxed onto someone's hand; then others, enticed by the food and reassured by the first bird remaining unharmed, follow its example.

The time between the first hesitant step of one bird and the creation of a group for which this has become a regular method of obtaining food will vary with the species, and the intensity with which the new behaviour is deliberately encouraged. The behaviour will vary also for different species, and according to the particular circumstances. Thus, in the case of the Wood Pigeons a notable (and personally gratifying!) feature was that in the early stages they could not be persuaded to fly to anyone but me, whereas



Ronald Harper

Wood Pigeon seemingly interested in the 'Crop Storage' issue of *Farmers Weekly*

Starlings *Sturnus vulgaris*, that have been taught to stand on the hand to feed, will from the outset go to other people using the same feeding technique.

Most birds in town parks are much tamer than their conspecifics in the country, and the London Wood Pigeons are no exception. That they flew onto the hand in Regent's Park in the 1920s is recorded by Grey (1927), and from 1934, perhaps earlier, until the war started in 1939, there were *many* Wood Pigeons in St. James's Park that would perch upon one's hand, shoulder or head for food. These very tame birds were probably killed off as pests as part of the Government's campaign to exterminate the Wood Pigeon (Goodwin 1978).

During February and March 1982, two Wood Pigeons came to me at a particular seat when I visited the park each weekend, and would take

*Ronald Harper*

Wood Pigeon waiting placidly to be fed

biscuit from my outstretched hand. Later they would perch on my hand, and one of them would let me run my fingers down its breast, stroke its neck and, to a lesser extent, the top and back of its head, but would not allow me to touch its wings. This behaviour was unusual, as at that time Wood Pigeons in St. James's Park, though they would approach people quite closely, were not tame. In March these two birds were joined by a male with all the toes missing from the left foot, and which was promptly named Stumpy. The naming of wild creatures as though they are pets may seem to some unnecessarily sentimental, but it is easier to use names in one's notes than to describe the distinguishing features each time. Similarly if I speak to them, it is because I believe they may respond, like horses, to a quiet tone of voice, and not because I expect a reply - not even in pidgin English as someone once suggested. Anyway, during April and May neither Stumpy nor his unnamed companions appeared for their biscuits and I thought the episode closed.

In early June three birds, one of them Stumpy, again came to me on the seat for food, readily flew onto my hand, and could be stroked. I was now visiting the park daily, and events moved rapidly. Within a few days it was clear that the birds, (a) had no difficulty recognising me, (b) were

prepared to fly onto my hand, but to no one else, and (c) would allow me to handle them to a remarkable degree, extending or imprisoning their wings, etc., in a way that even the feral pigeons *Columba livia*, var. would not tolerate.

The number quickly doubled, and later reached a peak for that year of about 10 birds, including two juveniles. When I entered the park and neared the section occupied by the tame birds, they would fly from the grass or from a tree up to 60 m away, landing confidently on my hand. Although one or two of the people who regularly fed the birds in the park tried hard to persuade these Wood Pigeons to fly to them, it was two and a half months after their reappearance in June before they flew to anyone else. However, in late August some started to do so, although in 1982 they remained selective and would not fly to strangers.

That first summer I fed them daily, but could not continue to do so indefinitely, and was concerned about stopping their regular meals, which they had now come to expect. Fortunately the birds solved the problem for me, as when that year's abundant crop of mast ripened on the copper beeches they were no longer interested in the digestive biscuit or pigeon mixture that they had taken so eagerly before. In any case, most London Wood Pigeons leave their nesting territories in early autumn, and return to them between the end of October and March; and tame individuals with an assured food supply leave with the rest (Goodwin, 1978). The presence, and absence, of a few ringed, and therefore individually recognisable birds in St. James's Park was monitored for four years. Most of those birds, but not all, left in the autumn, and all those that did so left in the second half of September, or in October, and returned between late December and the first week of April. However, birds with late broods are sometimes to be seen feeding unfledged young in the first half of November, and some, perhaps 10/15% of the number present in summer, were to be seen throughout the autumn and winter.

The birds that leave the park in autumn do not apparently go far, but probably move to a communal night-time roost, from which they disperse daily to feeding places in or on the outskirts of Greater London; very likely joining the large numbers feeding on beechnuts and acorns in such places as Hampstead Heath and Richmond Park (Goodwin, 1978). That some at least remain within easy range of the park was evidenced by the temporary reappearance of two ringed birds, both males, during their period of absence. One of them, 'absent' from 18th September 1983 until 7th April 1984, was present daily from 26th November to 11th December, and was also seen on two isolated dates, on 24th December and 28th January. The other, 'absent' from 12th October to 22nd December 1984, was seen on three dates, 24th November, and 1st and 8th December.

There is also often a marked difference in the size of the meals taken from the hand in winter. In summer, they will gorge themselves to capacity, as will those birds that overwinter in the park, whereas those that leave in autumn and return, say, at the turn of the year sometimes come briefly to the hand and fly off after eating only a small amount. It seems that these birds have a good supply of natural food elsewhere and, with the approach of the breeding season, are making short visits to their territories, as described by Murton, (1965).

Since that first summer I have made a point of feeding the Wood Pigeons *irregularly*. Although it is usually recommended that food be put out for garden birds regularly at bird tables, etc., regularity in the case of hand-tame wild birds is, in my opinion, best avoided. To consistently provide a particular bird with daily meals may seem at first thought to be solely beneficial, but it may cause too drastic a change in the bird's behaviour, turning it into a pet rather than a truly wild creature. If it believes it can depend upon a meal at a particular time it is unlikely to seek its natural food to the usual extent, and may become overfat and/or inactive, especially if fed with food that is deficient in some way. Also, regular feeding of a wild bird, perhaps several miles from one's home, cannot always be maintained or carried out punctually, and the bird itself may misjudge the time. Clearly any breakdown in a regular arrangement can cause the bird distress. The occasional nourishing meal at odd times, however, is beneficial without unduly affecting the bird's normal way of life, and can be regarded as a bonus. This arrangement is also flexible; the birds can be fed frequently when necessary, for example, in hard weather, and special attention can be given to the needs of any bird that is sick, injured or undernourished.

The tame birds remained tame and flew unhesitatingly to me on their return in 1983. Others followed their example, and that summer 20 Wood Pigeons were flying to the hand for food; fortunately not all at once, though they can sometimes be rather overwhelming when I first arrive. Incidentally, when counting the birds that fly to the hand, it is essential to mark them as you count, otherwise you will include more than once the birds that return for further helpings of food. Lipstick, being easily applied, easily removed and non-toxic, is ideal for this purpose. Since the dabbing of Wood Pigeons with lipstick seems to be regarded by any onlookers as eccentric behaviour, however, these censuses have been infrequent.

The situation still existing at the time of writing (September 1986) was established in that second year, although the number of hand-tame birds has now settled down at around 30. The birds no longer discriminated to the same extent between strangers and those they knew and con-

sidered trustworthy, but there was, and still is, individual variation, some birds going readily to strangers, others only after much coaxing, and some not at all.

Since they usually return to the same place in the park each year, the tame birds have remained for the most part a localised colony, but there are two or three in other parts of the park that now fly to the hand. These perhaps were tamed originally in the main colony, possibly as juveniles, and have chosen or been obliged to move elsewhere, but if you feed birds year in and year out in a particular place, you will become a familiar figure to many of them, and some may decide you are relatively harmless, and become trusting without any premeditated effort on your part.

Degree of tameness

The trustfulness of Wood Pigeons that have become hand tame is quite astonishing, particularly as this species is shot so extensively in other parts of the country that it is usually extremely wary. Their tameness on the hand (Gosling, 1985) far surpasses that of the feral pigeon, so that in comparison the feral pigeons in the park, and nearby Trafalgar Square, so well known for their tameness, are noticeably 'jumpy'. The Wood Pigeon is much more at ease. When it alights on the hand it will stand erect, waiting patiently to be fed, and will let you stroke its beautiful pink breast. Anyone doubting the loveliness of the Wood Pigeon should see it in this upright pose, standing motionless with head held high and alert gaze. In return for the food one can take surprising liberties with them: extend the wings, fan the tail, examine the wing pits, and carry them about the park, or out of the park. Stranger still, they will allow a cupped hand to be run firmly down their back from head to tail, and they can be gripped quite firmly over the closed wings, so that they are, in effect, imprisoned; also one can encircle the throat with thumb and index finger, grasping them quite tightly, yet they remain unperturbed by such handling. Such is their trust that although physically aware of what is happening, they do not feel imprisoned, any more than we feel imprisoned in a train or coach with doors operated by the driver. If the 'doors', or in this case the hand, fail to open when they wish to leave that is a different matter, for they will not willingly be held captive; yet those that have been held against their will for some necessary purpose will usually return to the hand an hour or so later.

In contrast the feral pigeon is more nervous, and if you wish to place your hand on it, it is usually necessary to do so when it is absorbed in eating, as they tend to shy away when touched, readily flying off at a touch or movement a 'Woodie' would ignore, though returning a moment later. It is a matter of temperament, and long acquaintanceship makes

little difference, so that a Wood Pigeon fed half-a-dozen times will still be more relaxed than a feral pigeon fed frequently for two or three years.

It has been suggested to me by Eric Gillham, who has been associated with the birds of St. James's Park for many years, that the relative indifference of the tame Wood Pigeons to being 'manhandled' may be in part linked to the manner in which they take from trees food that they cannot easily reach, namely by hanging, often upside down, with wings spread out among the branches for support. This I think is likely, for the Wood Pigeon is a robust bird, with powerful wings, as illustrated by the well-known 'wing-clap' used as a finale to its display flight and when disturbed. I sometimes feed them on a weeping copper beech, or weeping willow, and they will 'crash' noisily into the pendant branches, displaying in their eagerness to reach the food offered to them an acrobatic skill quite out of keeping with their portly appearance on the ground. Yet, notwithstanding their rough and tumble antics at times, and the aggressiveness that forms a necessary part of all birds' lives, they have a placid temperament, with a gentle and endearing 'dove-like' quality much in evidence.

Any study of separately recognisable birds highlights how individualistic they are. In the few, but widely different species that I have observed at close quarters it has always quickly become clear that the birds have minds of their own. It is not surprising, therefore, that the tame birds have their separate personalities and behave in different ways, nor that some Wood Pigeons can never be persuaded to fly to the hand, however often they see their conspecifics feeding there unharmed. Their sex is undoubtedly relevant to their character, but in the degree of tameness and willingness to be tamed, I have noticed no difference between male and female.

Recognition and memory

It was found that Wood Pigeons can readily identify a particular person even in a crowded park, and their ability to do so can be impressive when they swoop down from a tree or fly across the grass to land unhesitatingly on the hand.

Experiments showed that they recognise by sight the *person*, and not what is worn or carried, presumably, as we do, by the features, aided by other factors such as expression, stance and walk, which together make an identifiable whole. Grey (1927) records how a pair of Swallows *Hirundo rustica* recognised and attacked him when wearing the knickerbocker suit he wore when they found him examining their nest, though not if he was wearing a suit of similar colour but with trousers; and he found that his tame Robins *Erithacus rubecula* would not go to him if he wore dark clothing. The Wood Pigeons, I am pleased to say, do not seem to mind what I wear. Recognition is not dependent upon what is worn or carried,

or the time of day, or the direction from which their area is approached. A complete and simultaneous change of all these factors made no apparent difference, and the birds undoubtedly recognise the person, though no doubt if seen in unfamiliar clothing or unexpected circumstances they may do so less swiftly. Howard (1952) found that her tame Blue Tits *Parus caeruleus* and Great Tits *Parus major* recognised her whatever she was wearing, and that they also knew her voice. I do not know whether or not the Wood Pigeons know my voice, but recognition was purely visual during my experiments as I did not call or speak to them. That unfamiliar clothing can cause alarm is well illustrated by an experience of Derek Goodwin's (pers. comm.). Two young, *very* tame captive Wood Pigeons that had always seen him in an open neck shirt, and flown onto him, letting him handle them, went into a wild panic, fleeing from him and battering the wire when he entered their aviary wearing a tie. When he returned without a tie, they behaved with their customary tameness.

So far as recognising human beings is concerned, there is perhaps a tendency to under-rate a wild bird's capabilities. Such commonly heard remarks as 'feed the birds regularly and they will get to know you' give the impression that they are slow learners, that recognition is a gradual process requiring several encounters, preferably at a set time and place. This is not necessarily the case, and a strong association of ideas can override the need for repetition, so that recognition can be immediate. Feed a Wood Pigeon, or feral pigeon, well one day and you will often find it recognises you straight away the next. I imagine it is much as it is with us; we do not, cannot, take note of everyone, but are selective, remembering those who give us cause to do so, even though we have seen them only once before.

It was found that other species, too, may be good at recognising people, and a female Mallard *Anas platyrhynchos* would fly from the lake and follow me across the grass, not because there was any food in evidence but because she knew from past experience that it would be produced, and she would be given a good feed of corn and biscuit. In many cases the bird has the advantage. A Carrion Crow *Corvus corone*, for example, would fly across the park, land buoyantly three or four metres away, shout for food, and when it was produced walk up jauntily, but warily, to take it from my fingers. As it did not do this with anyone else it clearly knew me, yet apart from this unusual tameness, I could find no feature that would enable me to distinguish it from the other eight or nine Crows frequenting the park at that time.

Care is, of course, needed before concluding that a bird recognises you. The fact that a bird hurries straight to you with every sign of recognition does not mean necessarily that it knows you, as it may well do the

same to complete strangers. Many park birds rush eagerly to anyone they think may have food, and are quick to note the slightest hint of a possible 'handout'. Consequently, proof of recognition is not always readily forthcoming, and though I have fed certain Black-headed Gulls *Larus ridibundus* for several years now, I still only 'think' they recognise me.

Lack (1965) refers to instances of Robins remembering a person after an absence of six months, and cites the case of a Song Sparrow (Rufous-collared Sparrow) *Zonotrichia capensis* that remembered an event after 18 months (Nice, 1943). The Wood Pigeon's memory also seems to be long lasting. Bearing in mind that when they return from an autumn/winter absence, their memory would be 'jogged' by the sight of another Wood Pigeon feeding from my hand, I have, nevertheless, had instances indicating that they still recollect me on their return without being reminded. In one case, the *first* bird to fly to me as I entered the park was a ringed, identifiable bird that I had not seen for four months, and there was a similar occasion following an absence of just under three months. Also, one afternoon in February when there were no other Wood Pigeons near me, an identifiable bird, Stumpy, that had been absent for four months, flew in from outside the park and straight towards me, landing about three metres away, from where it hobbled up to feed from my hand.

Experiments with the closely related feral pigeon showed that they too can often remember a person after only one encounter, and that once you are firmly fixed in their memory they will remember you after an absence of four months. Quite likely they can do so after a much longer period, but I have no evidence as to this. Since the birds are subject to much the same deficiencies that affect our memory and eyesight, it is not surprising that much individual variation was noticeable - some birds obviously recognise you as soon as they see you, while others are never able to do so, and will peer at you doubtfully as you approach, even though you have been feeding them on and off for years.

The relationship

'Make friends with the birds' urged a leaflet published by the Royal Society for the Protection of Birds, and it catalogued nest-boxes, bird feeders, etc. But can you? Clearly the exhortation was not meant to be taken too literally, for you can give the birds every comfort - food, good homes, drinking water and washing facilities, yet they remain suspicious or indifferent. Wild birds that become tame may have different attitudes to this risky behaviour, but one fact is indisputable - they come for the food. Whether they come for any other reason is less easily answered, but Leonora Howard (1952, 1956), who had a uniquely close relationship with many wild birds, sharing her cottage with them as well as her garden,

records many instances of the birds going to her for help when they were in trouble.

Leaving aside birds reacting socially to man because of 'imprinting' and the unusual relationships arising sometimes from captivity, I do not believe that a mutual friendship can exist between a truly wild bird and a human being. Certainly a bird is not friendly because it feeds from your hand; in most cases it merely takes the food and then clears off. It is not interested in companionship, or in one's state of health, nor does one's generosity prompt it to reciprocate - which is just as well, for I have no wish to have avian delicacies deposited in my mouth. One can only befriend a bird, but that to me is sufficient, for their mere presence is a delight. Indeed anyone foolish enough to look for some sort of affection treads dangerous ground, for the most likely emotion they will encounter is the bird's anger or disappointment if offered pigeon mixture when it is hoping for peanuts!

Nevertheless, it would be unwise to conclude that tame birds *always* regard their human associate solely as a food dispenser. A close and trusting relationship can undoubtedly be created between a person and a bird, of importance to the bird (albeit as a source of food), and of several years' duration. Since one cannot enter a bird's mind, who can say definitely that this long-standing and valuable association does not develop in the bird some sort of feeling for the person who feeds it? Where trust is created the relationship may well reflect more than mere 'cupboard love' on the part of the bird, and it may respond to the person's behaviour; thus Wood Pigeons agitated by the presence of a dog, for example, and about to fly from the hand, often appear to be reassured by stroking and a quiet tone of voice to which they have become accustomed, much as one soothes a domestic animal (Gosling, 1985). Goodwin (1982) relates how Wood and feral pigeons noted that his presence in the garden protected them from cats. After being frightened by one, they would not, for a time, come down into his garden for food if he was not present, but if he went out and stood near the food they would at once do so, and would feed near him, only to fly up again as soon as he went indoors.

There have been two examples of Wood Pigeons staying on my hand other than for food. In one the bird remained there for 20 minutes after it had finished eating, leaving the remaining food on my hand untouched, while I stood talking to a companion. It was a warm, sunny evening, drawing to its close, and I concluded that, like us, birds get tired at the end of the day, and as it was at ease on my hand it was merely using it as a convenient resting place before going to roost.

The other example concerns a male 'Woodie' found hanging from a tree by nylon line caught around its leg, which was rescued by two friends of mine; a somewhat hazardous operation, as to cut it free entailed one of

them crawling along a branch 10 m up. Two years later, though the bird is permanently crippled, I am glad to say that it is still alive, and as far as I can tell, reasonably healthy apart from its injured leg. However, its behaviour on the hand since that time is in marked contrast to the others, as it will often remain on the hand for a few minutes after it has finished eating, and before flying off to its territory on Duck Island. This interval may well be just a matter of convenience, but its expression as it looks steadily into my eyes differs from the equally steady gaze of the other tame Wood Pigeons. It may well be that, following its injuries, it has had to live with pain, and that this is reflected in its expression but it *seems* to be trying to communicate, or to interpret my own expression, as though it is seeking sympathy or hoping for help - as is sometimes seen in the expressions of sick domestic pets. I am fully alive to the pitfalls of attributing human emotions to animals, yet the feeling is very strong that this bird's attitude to me, and human beings generally, for it was not I who rescued it, differs slightly from that of the other tame birds, and I believe that to omit this observation because it may seem more sentimental than scientific would leave this section incomplete.

Having touched on the birds' feelings, or lack of feelings, what of the person who has tamed them? Where does he stand in the relationship he has created? I assume that he, or she, will feel much as I do, not only an affection for the birds but also, having intervened in their lives, a measure of responsibility for their welfare. If care is taken the additional risk to which a tame bird may be exposed should be slight, especially when compared with the many hazards to which all wild birds are subject. However, the taming of wild birds is only excusable if one is satisfied that, taking a broad view, the advantages to the birds well outweigh any additional risks they may run. Fortunately if common sense is exercised, this should be the case, as much help can be given to tame birds if they are sick, injured or merely undernourished, and I know of several birds that, but for their tameness, would not be alive and healthy as I write.

Finally, I should be pleased to hear from any reader interested in tame wild birds, and to learn of their experiences and views, whether or not they agree with what has been said here.

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WALTER GOODFELLOW - ONE OF THE GREAT ORNITHOLOGICAL COLLECTORS

BY ALAN GIBBARD
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In the days before air travel had reduced a distance of several thousand miles to a few hours' flying time, the aviculturist depended on the efforts of a small band of men to collect, and successfully bring back on long sea voyages the rare birds that graced his aviaries. This small group of professional collectors included Wilfrid Frost, Cecil S. Webb, F. Shaw Mayer, and probably the most successful of all, Walter Goodfellow.

Walter Goodfellow was born in 1866 and started his career as an ornithological collector with an expedition to Colombia and Ecuador in 1898. This expedition was largely aimed at collecting museum specimens of which Goodfellow obtained 4,000 skins of over 500 species of birds.

By the turn of the century, Goodfellow was collecting on behalf of a number of wealthy aviculturists who desired to add rare and beautiful species to their collections.

One of Goodfellow's early patrons was Mrs. E. Johnstone who maintained a large collection of birds at Groombridge in Kent. In 1903, while collecting on Mount Apo on the Philippine island of Mindanao, Goodfellow obtained a species of lorikeet new to science. This was named *Trichoglossus johnstoniae*, Johnstone's Lorikeet, in honour of Mrs. Johnstone. Two years later, Goodfellow was able to return to England with three living examples of the new lorikeet for Mrs. Johnstone's aviaries. Goodfellow wrote some notes about this lorikeet in the *Avicultural Magazine* (January, 1906: 83-88) which were illustrated by a superb colour plate by H. Gronvold. In the following year, Mrs. Johnson described their successful breeding in her aviaries (1907: 44-46).

While collecting in Taiwan in 1906, Goodfellow noticed, in the head-dress of a native, the tail feathers of a previously undescribed species of pheasant. Goodfellow managed to obtain these feathers, and from them the Mikado Pheasant *Syrnaticus mikado* was made known to science. In 1912 Goodfellow returned to Taiwan and collected 11 living Mikado Pheasants. These birds were obtained by Mrs. Johnstone and the following year she bred them for the first time in captivity (*Avicultural Magazine*, 1915: 265-266, including colour plate by H. Goodchild).

Another great aviculturist for whom Walter Goodfellow obtained rare birds was E.J. Brook who kept a splendid collection of living birds at his home, Hoddam Castle, Dumfries. In 1909 Goodfellow brought

home for Brook a superb collection of birds from New Guinea. This collection included Greater, Magnificent, Blue, Princess Stephanie's, Meyer's Sickle-billed and Superb Birds of Paradise, as well as Gardener Bowerbirds and Wilhelmina's, Stella's and Fairy Lorikeets. To transport such a collection on a long sea voyage at the turn of the century required much care and skill.

Due to his great experience as a collector in the tropics, Goodfellow was invited to lead the British Ornithologists' Union expedition to Dutch New Guinea. The purpose of the expedition was to obtain skins for the British Museum, and over 300 different species were collected, 25 of which were new to science. Large collections were also made of mammals, insects and plant life. Before the expedition was completed Goodfellow was taken ill and had to return home. Another member of the expedition, Claud Grant, gave an indication of the conditions the party had to endure.

'The insect life was appalling, no sooner one species went to bed another arose to annoy throughout the 24 hours. A sort of Bluebottle fought with you for your food, and even tried to follow it down your throat. Big brown leeches were everywhere - in the trees and on the forest floor'.

For his efforts during the expedition Goodfellow was awarded the gold medal of the British Ornithologists' Union.

During the 1920s Walter Goodfellow travelled and collected extensively. In November 1925 he returned to Britain from the Far East with 27 birds of paradise, of six species, plus many fruit pigeons and parrots. In 1929 he brought to Britain the first Duivenbode's Lories and Bulwer's Wattled Pheasants to be seen in this country. Many of the birds collected by Goodfellow during this period went to the great private collections of Alfred Ezra, Jean Delacour and Herbert Whitley, while other specimens were acquired by London Zoo.

As well as a great collector, Goodfellow was also a great naturalist. He wrote several articles in the *Avicultural Magazine* describing his expeditions, and his detailed observations of the strange Standard-winged Bird of Paradise *Semioptera wallacei* (1927: 57-65) are still the most important yet on this species.

Walter Goodfellow died in 1953, 18 years after his last expedition. Despite his highly important work, the only worthwhile obituary notice of him appeared in the *Avicultural Magazine* written by David Seth-Smith (1955: 33) even then two years after his death. However, he stands out as one of the greatest collectors of live birds and without his pioneer efforts, many species would never have reached the wonderful private collections of the early decades of this century.

THE MOSCOW BIRD MARKET

BY JEFFERY BOSWALL

(Bristol)

On Saturday, 25th October 1986, I spent rather less than an hour at the bird market in Moscow. It was enough, because the wildlife protection laws introduced in 1980 preclude the sale of wild birds and all those for sale were domesticated species. Except, that is, for a couple of Goldfinches *Carduelis carduelis* and a Coal Tit *Parus ater* being offered from inside a jacket!

The market's bird population was dominated by hundreds of ornamental pigeons, many of them in excellent condition. There were - at a guess - a dozen or 20 breeds but I do not have enough knowledge to name them.

Among poultry, there were a dozen ornamental breeds, and a couple more ordinary ones of chickens and bantams; a handful each of 'Greylag' *Anser anser* and 'Chinese Swan' *A. cygnoides* Geese and a quartet of 'Mallards' *Anas platyrhynchos* and two Muscovy (appropriately enough) Ducks *Cairina moschata*.

The number of canaries *Serinus canaria* was perhaps two or three hundred. They varied quite widely in colour. Budgerigars *Melopsittacus undulatus* were about as common as canaries and there were a few Cockatiels *Nymphicus hollandicus* and two individual brightly-coloured Australian species, probably Rainbow Lorikeets *Trichoglossus haematodus*, and two Ring-necked Parrakeets *Psittacula krameri*. The only other Psittacine was a green parrot the size of a sparrow or a little larger, green with a delicate peach colour all about the head.

To complete the list there were about 10 Zebra Finches *Poephila guttata*.

It was 10.00 a.m. when I arrived, and the market was very crowded with people (some buying and selling not birds but dogs, hamsters and ornamental fish).

It was a grey, damp day and the market a somewhat drab place. But we all walked on asphalt, rather than in mud, there was no unpleasant smell and nothing at all untoward except for the very small transportation and display cages in which many of the smaller birds were confined. It is difficult to understand my taxi-driver's surprise that I should wish to visit such a 'dirty' place and to learn that Muscovites who might otherwise take foreigners there refrain from doing so for fear of incurring official displeasure.

ADDITIONS TO THE BIRD COLLECTION AT BERLIN ZOO (WEST GERMANY) IN 1984 and 1985

By PROF. DR. HEINZ-GEORG KLOS

1984

New Arrivals

2 Tataupa Tinamous	<i>Crypturellus tataupa</i>
6 South African Ostriches	<i>Struthio camelus australis</i>
2 Cuban Whistling Ducks	<i>Dendrocygna arborea</i>
4 Andean Geese	<i>Chloephaga melanoptera</i>
2 Magellan Geese	<i>C. picta</i>
4 Black-winged Stilts	<i>Himantopus himantopus</i>
4 Common Redshanks	<i>Tringa totanus</i>
3 Red-and-White Rails	<i>Laterallus leucopyrrhus</i>
2 African Jacans	<i>Actophilornis africanus</i>
2 White-breasted Swamphens	<i>Amaurornis phoenicurus</i>
2 Sun-Bitterns	<i>Eurypyga helias</i>
2 White-necked Cranes	<i>Grus vipio</i>
6 Buff-necked Ibis	<i>Thersticus caudatus</i>
4 Glossy Ibis	<i>Plegadis falcinellus</i>
3 Roseate Spoonbills	<i>Platalea ajaja</i>
2 Chaco Chachalacas	<i>Ortalis canicollis</i>
4 Congo Peafowl	<i>Afropavo congensis</i>
1 European Black Vulture	<i>Aegypius monachus</i>
2 Violet Touracos	<i>Musophaga violacea</i>
3 Red-billed Wood Hoopoes	<i>Phoeniculus purpureus</i>
1 Umbrella Bird	<i>Cephalopterus ornatus</i>
2 Red-billed Magpies	<i>Urocissa erythrorhyncha</i>

Hatched

3 Emus	<i>Dromaius novaehollandiae</i>
2 hybrid Penguins	<i>Spheniscus humboldti</i> x <i>S. demersus</i>
1 King Penguin	<i>Aptenodytes patagonicus</i>
3 Eurasian Cormorants	<i>Phalacrocorax c. sinensis</i>
3 Southern Screamers	<i>Chauna torquata</i>
5 Coscoroba Swans	<i>Coscoroba coscoroba</i>
6 Common Eiders	<i>Somateria m. mollissima</i>
3 European Flamingoes	<i>Phoenicoptera ruber roseus</i>
6 Chilean Flamingoes	<i>P. chilensis</i>
2 Cattle Egrets	<i>Ardeola ibis</i>

3 Scarlet Ibis	<i>Eudocimus ruber</i>
4 hybrid ibis	<i>E. ruber x E. alba</i>
2 Olive Pigeons	<i>Columba arquatrix</i>
2 Andean Condors	<i>Vultur gryphus</i>
1 African Black Eagle	<i>Lophoaetus occipitis</i>
7 Common Caracaras	<i>Polyborus plancus</i>
3 European Eagle Owls	<i>Bubo bubo</i>
1 Spectacled Owl	<i>Pulsatrix perspicillata</i>
5 Great Grey Owls	<i>Strix nebulosa lapponica</i>
1 hybrid Cockatoo	<i>Kakatoe moluccensis x K. alba</i>
4 Rufous Tree Pie	<i>Dendrocitta vagabunda</i>

1985

New Arrivals

5 Little Pied Cormorants	<i>Microcarbo melanoleucos</i>
5 American White Pelicans	<i>Pelecanus erythrorhynchos</i>
4 Wandering Tree Ducks	<i>Dendrocygna arcuata</i>
4 Eyton's Tree Ducks	<i>D. eytoni</i>
8 White-faced Tree Ducks	<i>D. viduata</i>
4 Black-necked Swans	<i>Cygnus melanocoryphus</i>
4 Emperor Geese	<i>Anser canagicus</i>
4 Red-breasted Geese	<i>Branta ruficollis</i>
2 Cape Barren Geese	<i>Cereopsis novaehollandiae</i>
7 Baikal Teal	<i>Anas formosa</i>
4 Ring-necked Teal	<i>Aythya collaris</i>
4 European Great Scaups	<i>A.m. marila</i>
4 Lesser Scaups	<i>A. affinis</i>
4 Peruvian Ruddy Ducks	<i>Oxyura vittata</i>
7 Hooded Merganser	<i>Mergus cucullatus</i>
3 Spotted Thicknee	<i>Burhinus capensis</i>
23 Avocets	<i>Recurvirostris avosetta</i>
4 European Curlews	<i>Numenius arquata</i>
3 Common Sandpiper	<i>Actitis hypoleucos</i>
2 Common Redshanks	<i>Tringa totanus</i>
8 Ruffs	<i>Philomachus pugnax</i>
3 Lapwings	<i>V. vanellus</i>
3 European Oystercatchers	<i>Haematopus ostralegus</i>
2 Stanley Cranes	<i>Anthropoides paradisea</i>
1 Grey-winged Trumpeter	<i>Psophia crepitans</i>
2 Kori Bustards	<i>Ardeotis kori</i>
9 Lesser Flamingoes	<i>Phoenicopterus minor</i>
2 Maguari Storks	<i>Euxenura maguari</i>

8 Sacred Ibis	<i>Threskiornis aethiopicus</i>
2 Black-headed Ibis	<i>T. melanocephala</i>
4 White Ibis	<i>Eudocimus ruber var. alba</i>
3 African Spoonbills	<i>Platalea alba</i>
1 Black Curassow	<i>Crax fasciolata</i>
3 Egyptian Vultures	<i>Neophron percnopterus</i>
3 Little Owls	<i>Athene noctua</i>
2 Ural Owls	<i>Strix uralensis</i>
2 Keas	<i>Nestor notabilis</i>
2 Gang Gang Cockatoos	<i>Callocephalon fimbriatum</i>
2 Leadbeater Cockatoos	<i>Kakatoe leadbeateri</i>
2 Western Grey Plantain-eaters	<i>Crinifer piscator</i>
2 Tawny Frogmouths	<i>Podargus strigoides</i>
2 Crested Quetzals	<i>Pharomachrus antisianus</i>
1 Rhinoceros Hornbill	<i>Buceros rhinoceros</i>
2 Toco Toucans	<i>Rhamphastos toco</i>
2 Keel-billed Toucans	<i>R. sulfuratus</i>
2 Channel-billed Toucans	<i>R. vitellinus</i>
4 Japanese Waxwings	<i>Bombycilla japonica</i>
10 Cardinal Queleas	<i>Queleopsis cardinalis</i>
5 Buffalo Weavers	<i>Dinemellia dinemelli</i>
4 Lesser Sunda Mannikins	<i>Munia quinticolor</i>
3 Rosy Pastors	<i>Pastor roseus</i>
4 Regal Starlings	<i>Cosmopsarus regius</i>

Hatched

3 Rheas	<i>Rhea americana</i>
6 Emus	<i>Dromaius novaehollandia</i>
2 Black-footed Penguins	<i>Spheniscus demersus</i>
1 hybrid penguin	<i>S. demersus x S. humboldti</i>
2 Cormorants	<i>Phalacrocorax carbo</i>
8 Southern Screamers	<i>Chauna torquata</i>
4 Coscoroba Swans	<i>Coscoroba coscoroba</i>
3 Swan Geese	<i>Anser cygnoides</i>
4 Bar-headed Geese	<i>A. indicus</i>
5 Canada Geese	<i>Branta c. occidentalis</i>
2 Egyptian Geese	<i>Alopochen aegyptiacus</i>
3 Crested Ducks	<i>Lophonetta s. specularioides</i>
6 Common Eiders	<i>Somateria m. mollissima</i>
5 Red-crested Ducks	<i>Netta rufina</i>
8 North American Ruddy Ducks	<i>Oxyura j. jamaicensis</i>
1 European Goldeneye	<i>Bucephala clangula</i>

3 European Flamingoes	<i>P.r. roseus</i>
7 Chilean Flamingoes	<i>P. chilensis</i>
2 Boat-billed Herons	<i>Cochlearius cochlearius</i>
1 Hammerkop	<i>Scopus umbretta</i>
2 Andean Condors	<i>Vultur gryphus</i>
1 Rueppell's Vulture	<i>Gyps rueppelli</i>
2 Pallas's Sea Eagles	<i>Haelaeetus leucoryphus</i>
(died during hatching)	
3 Common Caracaras	<i>Polyborus plancus</i>
2 Kestrels	<i>Falco t. tinnunculus</i>
2 European Eagle Owls	<i>Bubo bubo</i>
1 Verreaux's Eagle Owl	<i>B. lacteus</i>
4 Snowy Owls	<i>Nyctea scandiaca</i>
7 Great Grey Owls	<i>Strix nebulosa lapponica</i>
4 Peach-faced Lovebirds	<i>Agapornis roseicollis</i>
3 Red-rumped Parrots	<i>Psephotus haematonotus</i>
3 White-cheeked Touracos	<i>Tauraco leucotis</i>
2 Giant Laughing Kingfishers	<i>Dacelo gigas</i>
3 Red-billed Wood Hoopoes	<i>Phoeniculus purpureus</i>
2 Black-throated Finches	<i>Poephila cincta</i>
11 Celebes Starlings	<i>Scissitorstrum dubium</i>
2 Coletos	<i>Sacrops calvus</i>

* * *

REVIEWS

HIGHLIGHT THE WILD: The Art of the Reid Henrys

By Bruce Henry. Palaquin Publishing Ltd., Hulford's Lane, Hartley Witney, Hampshire RG27 8AG. ISBN 0.90681401 4. 152 pages. 40 full page colour plates, 67 black and white illustrations. Available from the publishers, price £20.00 plus £2.00 postage and packing.

The very first birds I ever kept were a pair of Black-headed Munias *Lonchura malacca* and I've been passionately interested in the genus ever since. Throughout the 1950s I bought every field guide I could find, as long as it had a munia in it. In 1955 I was delighted to discover a new book *Guide to the Birds of Ceylon* by G.M. Henry, and will never forget the plate illustrating the Ceylon Hill Munia *L. kelaarti*. The plates, painted by the author, were in the classic field guide tradition epitomised by Archibald Thorburn and Roland Green. They indicated a limit of habitat and portrayed the birds in natural positions. I loved them then, and still do. Then, in 1960 I received C.J. Skead's *The Canaries, Seed eaters and Buntings of Southern Africa* which is illustrated in part by D.M. Henry, very much in the tradition of G.M. Henry. I had discovered the Henrys.

A few years later I joined the Society of Wildlife Artists and not only became familiar with the work of D.M. Henry, or David Reid Henry as he was known, but met him at one of the exhibitions and also at one of the Avicultural Society evenings. On the latter occasion, if I remember right, David was accompanied not by his celebrated African Crowned Eagle, 'Tiara', but by a Peregrine Falcon. He explained how the plumage patterns of the breast of a bird of prey vary from neat and regular on a recently-fed bird, to irregular and overlapping on a hungry bird with an empty crop and demonstrated this by feeding the bird on hand. David was one of my hero figures and I think I admired his bird paintings more than those of any other certainly his style was the one I tried to emulate most.

My job has me travelling about the globe a great deal, with timing that I'm not always able to control. I was, therefore, quite delighted to be able to attend an exhibition of the art of the Reid Henrys held in London in October, and - like all members of the Society - to have the opportunity of buying a copy of the book *Highlight the Wild* at a pre-publication price. To my surprise I learned that there were not two, but three Henrys. George was the father, David and Bruce the two sons, and both painters like their father. The book is written by Bruce Henry, the only surviving member of the trio.

It is a fascinating book, unique in its content for it is simultaneously

biography and autobiography. Unlike most books of its kind, however, the author not only writes the usual biographical data, and very interesting too, about family history and personalities, but contributes chapters on *how* the Henrys painted and how he himself paints. I found this totally absorbing. The book is lavishly illustrated with over 40 colour plates divided equally between the three, together with a large number of reproductions of sketches from notebooks and field sketch pads.

Many readers will be familiar with the work of David Reid Henry, whose superb bird portraits frequently illustrated the *Avicultural Magazine* in the days when a colour plate was not beyond the editor's production budget. And those who own George Henry's Ceylon book will know him well. Bruce Henry, however, will be new to most readers. His style reminds me of George Lodge. He paints pictures which contain birds (a subtle but significant difference) and his scope is broader than that of his father or brother, ranging from birds to animals, flowers and true landscapes. Discovering him in this book was a surprise and a pleasure.

This is a book for lovers of bird artists, the many colour plates will be a source of pleasure (and in some cases a useful reference) and the text most enjoyable reading.

R.R.

CLINICAL AVIAN MEDICINE AND SURGERY

Eds. Greg and Linda Harrison. W.B. Saunders, West Washington Square, Philadelphia, Pa. 19105, USA. 75 US dollars.

Thirty-three avian veterinary specialists, mostly American, have pooled their knowledge to produce this much needed work. The editors are Greg Harrison, Florida veterinarian, and his wife Linda.

This weighty volume of more than 700 pages will prove invaluable to veterinarians and advanced aviculturists. An ambitious project, it covers in detail all aspects of avian medicine and surgery. These include haematology, microsurgery, microbiology, sex determination techniques, diseases of imported birds, zoonotic diseases, virology, serology, diagnostic tests, fractures, evaluation of droppings, aerosol therapy, radiology and many other subjects.

Its scope and depth are perhaps unprecedented: it is a mine of practical information. For example, five authors contribute to the chapter on diagnosis. Charts represent the most common clinical conditions, detailing clinical signs, species affected, history and possible causes. The veterinarian with but slight experience of birds should find this section of great value.

The chapter on therapeutics includes 20 pages of tables listing anti-

biotics, their dosage, frequency, etc. The notes include such information as Chloromycetin palmitate (Parke-Davis) being useful in hand-feeding birds in which food passage has slowed owing to bacterial infection.

The chapter on clinical anatomy contains numerous original line drawings showing sections from a growing feather, skeleton, cranial osteology, musculature, air sacs, internal structures, viscera; arterial supply, major blood vessels, etc., etc.

There are more than 300 illustrations. Many of the photographs are instructive - shaping a beak, weighing, handling, collecting blood, preparing blood smears, endoscopy and the use of an orthopaedic stockingette as a temporary protective device to prevent self-mutilation of sternal injuries or surgery.

In his Foreword to this book, Murray Fowler wrote: 'Ten or 15 years ago only a handful of pioneers devoted significant practice time to birds. Now there are many full-time avian practices, some with three or more clinicians and full laboratory support. Hundreds of practitioners devote a major percentage of their time to birds.' He was writing of the situation in the USA. Hopefully, during the next decade more specialist avian practices will be developed in the UK. This volume will surely point the way.

It is available from the publishers but no doubt a distributor will be found in the U.K.

R.L.

INTERNATIONAL ZOO YEARBOOK - VOLUME 24/25

Ed. P.J. Olney. Published by the Zoological Society of London, Regent's Park, London NW1 4RY. ISBN 0074-9664. 651 pages, 30 b/w photographs, numerous line drawings and diagrams. Price: £46.00 hardback, £39.00 softback.

The *International Zoo Yearbook* is a unique publication and an essential addition to the library of all those seriously concerned with breeding birds and animals of non-domesticated species.

Normally published annually, the recently published volume (24/25) covers two years, 1982 and 1983. One of the most avidly read sections of the *Yearbook* is that devoted to records of birds, mammals and reptiles bred in zoos throughout the world. The giant task of collating data from all the major zoos and countless smaller ones, inevitably means that the records are two years behind publication date. Nevertheless, they provide the world's only comprehensive reference to what is being bred and where. Hatchings (and births) and the number of surviving young are recorded.

(One cannot help reflecting that the number of birds bred by zoos is small in comparison with numbers reared by private aviculturists.)

The census of rare animals in captivity provides invaluable information to breeders and zoo visitors interested in a particular species. As an example, in 1983 there were eight Bulwer's Wattled Pheasants in zoos: two in Antwerp, four in San Diego and two in Walsrode.

Each volume takes as its theme a subject which occupies a large proportion of its pages. Breeding endangered species is the theme of the volume under review; in fact, it contains all the papers presented at the Fourth World Convention in the Netherlands during 1984. The 219 pages in this section include papers on diurnal raptors, breeding programmes for waterfowl and flamingos, and breeding and reintroduction of pheasants.

In 'Captive management and the conservation of birds', Alexandra Dixon explains why captive breeding as a means of conservation is more easily applied with birds than with mammals. He uses several case histories to illustrate this point.

By 1980 it was believed that the population of the Lord Howe Island Rail (a flightless species) had been reduced to under 20. After a two-year study of the birds and their habitats, three pairs were taken into captivity in 1980 and two more pairs the following year. In December 1983, when the captive breeding programme ended, 78 had been reared, 74 of which had been released. Some of these had themselves bred successfully by February 1983.

A standard feature in the *International Zoo Yearbook* is that of new developments in the zoo world. Breeding the Great Indian Hornbill at Cotswold Wildlife Park and a unit for the transportation of developing eggs are just two of the papers found here.

The reference section includes addresses, names of curators and numbers of specimens kept of nearly all the zoos and aquaria of the world. Attendance figures are also given.

R.L.

AVES DO BRASIL (BIRDS OF BRAZIL)

Volumes IV and V. BEIJA-FLORES (HUMMINGBIRDS)

By Augusto Ruschi. Bilingual Edition, 1982. Available from Wheldon & Wesley, Ltd., Lytton Lodge, Codicote, Hitchin, Herts. Price: £165 approx.

The volumes under review are part of a series, the first of which appeared in 1979. The first volume was published under the title *Aves do Brasil (Birds of Brazil)* and no indication was given that it was, in fact, Volume 1 of a series. In 1981 a further volume appeared which was given

the same title but was designated as Volume II. This volume was not uniform in size to the first, also the dust wrapper was white (in the first volume the dust wrapper was brown). Volumes IV and V are uniform to Volume II in that they are of the same size and also have white dust wrappers.

Although these two volumes are dated 1982, they have only recently appeared in the UK (November 1986). Whether Volume III will appear is debatable as the author is no longer alive.

The volumes are large format (14½ x 11 in - 36.8 cm x 27.9 cm). There are some 452 pages (206 in Volume IV and 246 in Volume V). They are illustrated throughout in colour with photographs by the author and paintings by Etienne Demonte.

Some of the photographs are of poor quality; very few are of a professional standard. However, as many depict species which have rarely if ever been illustrated before and as many show behavioural activity (i.e. nest-building, incubating, feeding of young, stretching, yawning, bathing, etc.), they are of interest and add greatly to the usefulness of the volumes.

The colour paintings are excellent but few are captioned and as some appear before, and others after, descriptions of the species depicted, confusion may arise.

In both volumes, the text in Portuguese runs parallel down the page with the English text. From pages 1-84 the Portuguese text takes up the top half of each page with the English translation on the bottom half.

The translation is poor and parts of the text are extremely difficult to follow. Pages 3-84 are taken up with general information on the Trochilidae including annual cycle, biological and ethological remarks, ecological considerations related to hummingbirds, electrocardiographic tracings of hummingbirds, sonographical analysis of the songs and calls of hummingbirds, and the study of ornithology in Brazil. Pages 77-426 give the classification and description of species and subspecies (found in Brazil). Pages 427-430 give a list of types examined in certain museums and the remaining pages are taken up with an extensive, although inadequate (as so many well-known papers and other publications are missing) bibliography and a general index.

The Trochilidae is a family about which one can rarely generalise. I have learned over the years that should one state that hummingbirds never do such-and-such a thing, eventually a species will surely prove otherwise. Many authors fall into this trap and Ruschi is no exception.

On page 4 he states that hummingbirds are unable to walk on the ground. *Adelomyia melanogenys* can and often does walk on the ground, also *Phlogophilus hemileucurus* may not actually 'walk' but it certainly can run along the ground. On page 14 Ruschi states that the song is

hereditary. Skutch (in many of his writings) gives proof that many, if not all species learn rather than inherit their songs.

Ruschi, under the subheading 'Restocking and reproduction in captivity' (pp 34-35) mentions that more than 100 species have reproduced in the aviaries of the Museu de Biologia Prof. Mello Leitao. Due (partly) to this success, hummingbirds were dispatched to zoos and institutions in many parts of the world. It appears that 50 specimens were sent to London Zoo. As the birds were offered as the nucleus of a world-wide breeding programme, the Brazilian authorities must have been somewhat naive to say the least! Although Ruschi must have believed that the birds would, in fact, reproduce as he writes: 'There is no difficulty to make hummingbirds live and reproduce in captivity; the indispensable requirements: water, tree, nectar flowers, food with water and 25% sugar (from sugar cane), protein, the raising of Dipteros of the genera *Drosophila*, fed with banana, ananas'. Kept under almost natural conditions in aviaries in Brazil, the above would no doubt prove correct, but this is far from the case in more temperate climes where the birds have to be housed in heated indoor accommodation.

The main section of the two volumes is taken up with the description of species/subspecies, and for each the following data are given: geographical distribution, characteristics, habitat, migration and behaviour such as nesting, bathing, song, resting attitudes, courtship and sleeping.

As with an earlier book, *Hummingbirds of the State of Espirito Santo*, (reviewed by me, *Avicultural Magazine*, 89: 242-243), Ruschi has again generalised on certain aspects. As many of the species on which he writes have been studied (by him) in captivity, one would have thought that he would have recorded the sexual differences in such genera as *Colibri* (males have a shorter and less curved bill than females), and *Phaethornis* (length of tail and bill), yet he often writes 'sexes similar'.

Some observations made by the author are of particular interest and provide details which, as far as I am aware, have not before been recorded (in English). In the past, many authors (including myself) have believed that 25% of females in *Florisuga mellivora* are dimorphic. Ruschi (p. 192) informs us that all immature birds have plumage similar to that of an adult male and it is only after the first moult that females acquire their distinctive colour pattern.

In *Hummingbirds of the State of Espirito Santo*, Ruschi failed to describe the eclipse plumage of certain Brazilian species. This he rectifies in the current volumes, although he does still generalise somewhat with the descriptions. *Heliomaster squamosus* males do not 'become like the female', there are obvious plumage differences, and *Calliphlox amethystina*

loses its long tail feathers and iridescent throat patch when in eclipse plumage. Of special interest is the description of the eclipse plumage phase in *Heliothryx aurita* (p. 402). If it is correct, it would mean that there are five species of hummingbird that have an eclipse plumage. However, Ruschi does spoil this most interesting observation when he writes, 'This bird possesses a peculiarity found only in its genera (sic) in the family Trochilidae. The male has a post-nuptial molt (sic) in which he loses all his iridescent feathers and looks entirely like the female adults'. As mentioned earlier, Ruschi describes the eclipse plumage phase in other species (not from the genus *Heliothryx*). I can only presume he either wrote on certain species at different times and then brought all his observations together to form the volumes under review, or the translation is incorrect.

Whichever is the case, *H. aurita* males could not possibly '....become like adult females', as the latter has a much longer tail than the male. The species has proven almost impossible to keep alive for any length of time in captivity (in Europe) and only someone like Ruschi (who kept hummingbirds under near natural conditions) could have witnessed the eclipse plumage phase.

Many of the descriptions of nuptial displays are extremely detailed and it was most interesting to learn that *Heliactin cornuta* does use its 'horns' during the display; something I had never witnessed when I kept and studied the species.

Many may feel that at £165.00 the two volumes are somewhat expensive, but with such a wealth of detail, to my mind they are well worth the money. If you are interested in the Trochilidae, then purchase the volumes, you will not regret it.

For the more monetary minded, it is worth noting that all previous volumes in this series have almost doubled in value the moment they have gone out of print.

A.J.M.

* * *

CORRESPONDENCE

The Cloven-feathered Dove (Drepanoptila holosericea)

It was with interest and gratitude that I read the very interesting and well-informed comments by Mr. Derek Goodwin (Vol. 91, p. 242-3), an ornithologist of international repute, concerning my article (Vol. 91, p. 32-41) on the captive rearing of the Cloven-feathered Dove, for which I hope he will accept my deepest thanks.

Since my article was published I have made further observations which exactly confirm Derek Goodwin's hypotheses.

I have now reared birds of a third generation and the behaviour of these young is exactly the same as that of their predecessors taken from the wild.

The rule of only one egg and care by the female exclusively are exactly confirmed but we have since observed matings, which was not the case at the time of publication. Infrequent and brief pairing on branches of foliage had been described, but generally successful coupling takes place on the ground, as Mr. Derek Goodwin supposes.

Second generation males, like their fathers, come down to the ground to mate. When my keeper tells me that he has seen a male on the ground, we know that the female must lay in the days that follow. No particular site on the ground has been recorded but this point needs further observation.

In New Caledonia efforts have been made to protect this unique and splendid bird but these clash with material impossibilities. The 'Green Pigeon' continues to be shot at every opportunity.

I share Mr. Derek Goodwin's opinion on the possibility of releasing birds reared in captivity on a suitable island. I am myself prepared to participate in such a project but my experience of nature, and above all, human nature makes me express many reservations. For every successful experience, such as that of Little Tobago and its birds of paradise, how many failures!

As for New Caledonian birds, one interesting attempt to transplant the splendid Horned Parrot *Eunymphicus c. cornutus* was made several decades ago in conditions apparently ideal. These birds, endemic to the mountains of New Caledonia, were transported to the nearby island of Mare which forms part of the Loyalty Islands, adjoining New Caledonia. Two years later none of these birds was left on Mare. Optimists said that they had returned to their place of origin, others thought that they had perished either spontaneously or with the aid of the aboriginal natives. No habitat could have resembled more closely that of these birds' origin.

One should reflect on this before dealing recklessly with such a precious capital but the hypothesis is attractive and should not be lost from view.

In the meantime I persevere with breeding the Cloven-feathered Dove with some success but also some failures and disappointments. Several birds have died accidentally, surviving usually until the beginning of the breeding season. The statement about the compatibility of pairs applies equally to wild birds as to their descendants. Some pairs are incompatible and the female can sometimes be killed in a few minutes with no warning of such aggression.. We have saved some in a very unfortunate state, but unhappily we have equally lost some.

For two years I did not rear one bird: clear eggs, dead in shell, very bad weather conditions. However, at the moment of writing, two young are almost independent and a third is preparing to leave the nest. It is at these moments that aviculturists have the temerity to think that their efforts count for something.

Bondy, Paris.

Dr. Henri Quinque

* * *

Breeding the Moluccan Mannikin (Lonchura molucca vagans)

Readers might be interested to know that I was successful with the Moluccan Mannikin this year. Two chicks left the nest on 11th September and are now fully supporting (1st October). At first, the chicks were very like an adult Bib-Finch *Lepidopygia nana* in appearance and size but they are now almost as big as the parents and are just starting to show the head colour.

Six established adults of unknown sex and each wearing a different coloured split ring were released into a new aviary at the end of June. The accommodation was shared with Narcissus Flycatchers and Variable Sunbirds. At first, the Mannikins built the usual roosting nest in a standard finch, open-fronted nest box, placed high up in the aviary and screened with small branches of fir. All six shared this with no animosity. After a short time, however, I noticed that one Mannikin appeared to be chasing the others away from the nest-box. As I could not be sure which two of the six had paired up, I decided to leave things as they were. I had previously bred the Bib-Finch with unmated birds being present and on this occasion there was no actual fighting. I am still not certain, however, whether the Moluccan Mannikins are better housed in pairs or in a group. I was subsequently able to identify the breeding pair and to observe that

the chicks would beg for food from any of the six adults. The main rearing foods were soaked seed and a relatively small amount of mealworms. Egg food was ignored. I cannot be certain of the incubation period but believe it to have been approximately 15 days. The chicks left the nest at approximately 22/23 days old.

48 Twickenham Road,
Newton Abbot, Devon.

J. Faulkner

VISIT TO PARKLANDS

Members and their guests were privileged to be invited by Mr. and Mrs. Ken Dolton to visit their home at Parklands, near Worcester, on Sunday, 14th September, 1986.

After a pleasant lunch at the Crown Inn, Hallow, over 80 visitors assembled at Parklands at 2.30 pm. and our hosts conducted us round their very extensive collection of psittacines and waterfowl and what must be one of the largest collection of tortoises in the country. All these were contained within a series of beautifully landscaped gardens with many rare specimen trees and shrubs. It was hard to believe that 20 years previously this magnificent park had been rough fields and that Ken Dolton had created all this beauty and interest by himself.

Our hosts entertained us to a very lavish tea in the garden and it was pleasant to sit in the warm autumn sun in such lovely surroundings. For those of use who had not seen Parklands before the visit was a revelation and the warm welcome from our hosts gave great pleasure to everyone and a day to remember. It was particularly generous of our hosts to donate the entrance money (£83.00) to the Society's funds. Ken Dolton is a very active Council Member and the Society is most grateful to him and his charming wife for all their interest and support.

* * *

It has come to my notice that a possible first breeding has gone unremarked in the *Avicultural Magazine*. In 1981 Mr. and Mrs. R.E. Mann successfully bred the Red-topped Amazon Parrot *Amazona dufresnia rhodocorytha* which is believed to be a first success in this country. (Vol. 88, 1982, No. 1: 12-14). Anyone knowing of a prior breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to inform me.

Hon. Secretary

OWL SYMPOSIUM AT LILFORD HALL

A symposium on owls is to be held at Lilford Hall, nr. Oundle, Peterborough, on 10th May 1987 and the emphasis will be on the captive maintenance and propagation of these interesting birds. Although a number of papers are to be presented by aviculturists with long experience in the care of owls it is intended that the symposium should be run in an informal manner which will encourage comment and participation from the audience.

Lilford Hall is situated in a beautiful park which is stocked with an extensive collection of birds including many species of owls. Large numbers of owls have been bred in the aviaries at Lilford during the past decade and the symposium has been arranged at a time when young owls of many species should be in evidence.

The morning session is planned to run from 10.00 a.m. to 12.30 p.m. and the afternoon session from 3.00 p.m. until 5.30 p.m. This programme has been arranged so as to allow those attending the symposium to have adequate time to tour the aviaries and a wildlife exhibition which is to be held in the Hall on the same day.

The morning session of the programme will be under the chairmanship of Peter Olney (Curator of Birds and Reptiles at London Zoo) and John Ashbourne will chair the afternoon session. The following papers will be included during the symposium:

Philip Dugmore - Keeping and Breeding the Milky Eagle Owl *Bubo lacteus* in Britain.

Dr. Dieter Minnemann (Curator of Birds at East Berlin Zoo) - The Owl Breeding programme at Tierpark Berlin. Keeping and Breeding the Harpy Eagle *Harpia harpya* at Tierpark Berlin.

Bernard Sayers - An Overview of Two Decades Breeding Owls in a Private Collection.

Tony Turk (Curator of Lilford Aviaries) - The Laws Relating to Keeping, Breeding, Selling, Importing/exporting and Quarantining of Owls.

Tony Warburton (Director of the Barn Owl Breeding and Release Scheme) - The Captive Breeding and Release of Barn Owls as an Aid to Conservation.

There should be at least two other speakers.

This symposium is being arranged privately and all costs and charges have been kept to an absolute minimum. Tickets for the symposium, which include the cost of morning coffee, lunch and afternoon tea, are

priced at £12.00 per person. Alternatively, if lunch is not required, tickets are at the reduced price of £7.00 per person. All cheques to be made payable to B.C. Sayers. All participants will also have to pay admission when entering the Park gates - currently £1.40 for adults and 70 p for children. There is a licensed bar in Lilford Hall and this will be open after the close of the symposium so that informal discussions and socialising may continue into the evening.

All bookings and enquiries to B.C. Sayers, 164 Chelmer Road, Chelmsford, Essex, CM2 6AB, England.

* * *

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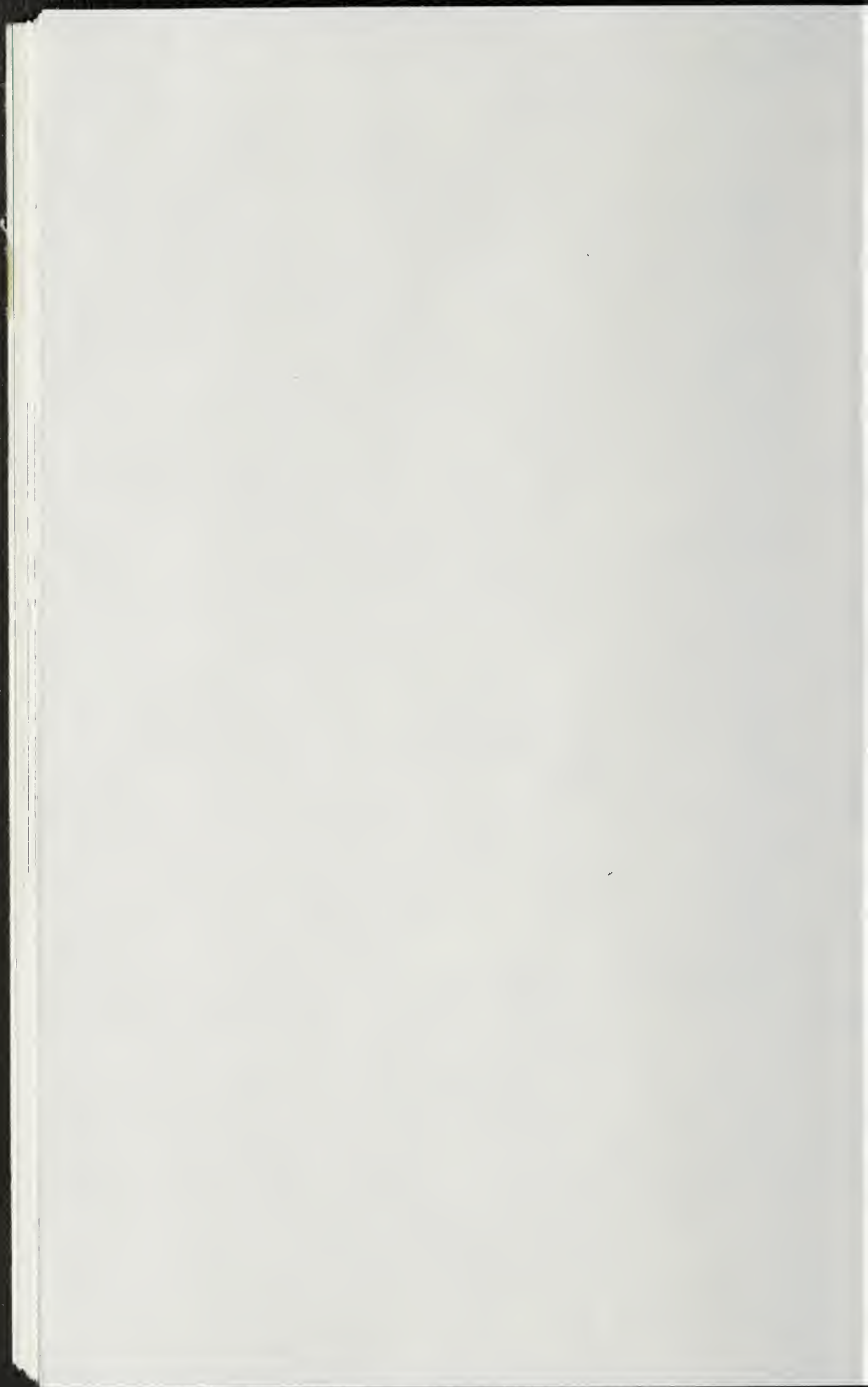
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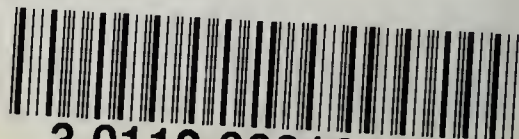


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